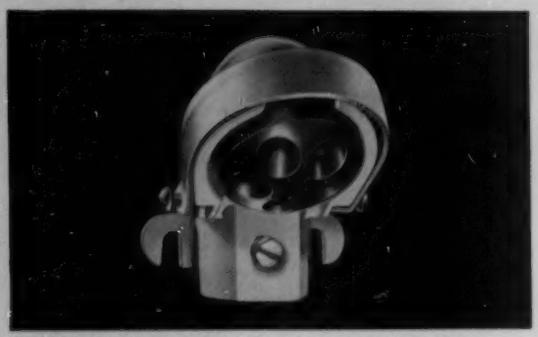
ELECTRICAL SOUTH

Serving the 18 Southern and Southwestern States

Contractor's "safe wiring" promotion produces increased volume — page 28

JULY, 1956



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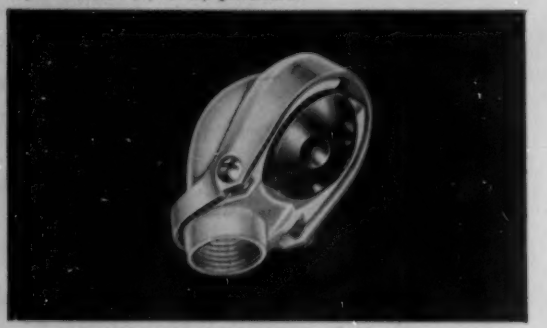

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Volume 36 **Number 7**

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Economic comment

by J. Whitney Bunting, Ph.D.
Contributing Economics Editor

Consumer purchasing power

The claims and counter-claims, now in the political winds, concerning the problem of inflation are growing more and more heated. Actually there is no reason for inflation to be an issue in the coming national election unless circumstances appear that have been noticeably absent during the Eisenhower Administration. The truth of the matter is that the value of the consumer's dollar has been remarkably steady over the past three-year period according to reports of the National Industrial Conference Board.

These facts have been substantiated, moreover, by the current research of the Bureau of Labor Statistics, United States Department of Labor. Based upon a 100 cent dollar in 1945, the figures show that the dollar during the past three-year period has averaged around 70 cents.

This fact will have little significance to those "old-timers" who certainly can remember when the dollar bought more food, clothing and shelter. During the height (or depth) of the depression period, the dollar was worth face value or sometimes more in terms of goods and services. At that time there was a scarcity of dollars in relation to available consumer goods.

In recent years, this nation has been rolling along with an unprecedented prosperity era, and with many dollars in payrolls entering the prospective consumer market. Usually, under these conditions, it is difficult and well-nigh impossible to hold the line on prices and prevent a runaway period of inflation. In fact it is often this runaway inflation that causes the end of prosperity and brings forth a depression period.

Inflation in its early stages is apt to be a welcome visitor, particularly because it is generally a harbinger of good times. It breeds employment, creates sales, and makes for steady or rising markets and hence good productive conditions. Later, however, as prices outrun the means to buy, it becomes less of an asset and more of a definite liability. In the long-run, if unchecked, it promotes fear, unemployment, and loss of production. How to save the benefits and to avoid the pitfalls has been a serious consideration to government leaders under the free enterprise system.

Controls appear effective

The present administration in Washington with the help of the Federal Reserve Board had had a rather cautious approach to inflation. In fact at times it has appeared that the two forces, political and banking, might pull away one from the other. A few weeks ago, for example, the Federal Reserve Board through interest controls, tightened up on the money market and thus restricted the further build-up of consumer and other forms of credit. Financial leaders and government officials teamed up to protest this action claiming that it definitely was unnecessary and the timing might well cause recession or depression consequences.

Since then some relaxation has been allowed and the Federal Reserve Board has, through market operations, allowed additional funds to become available for continued credit operations. Yet it is this very careful control of credit and monetary supply that has permitted the dollar to remain so very constant in value.

The reaction of organized labor to the Republican Administration is in part based upon continued good times and plentiful purchasing power. Many analysts and observers have pointed to labor's new interest in Mr. Eisenhower and a recent Gallup Poll showed that the Republicans now have a "labor edge" over the Stevenson Democratic candidacy. Whether or not this organized labor support will continue will depend in large part upon the government's ability to maintain present prosperous conditions with the dollar value virtually unchanged.

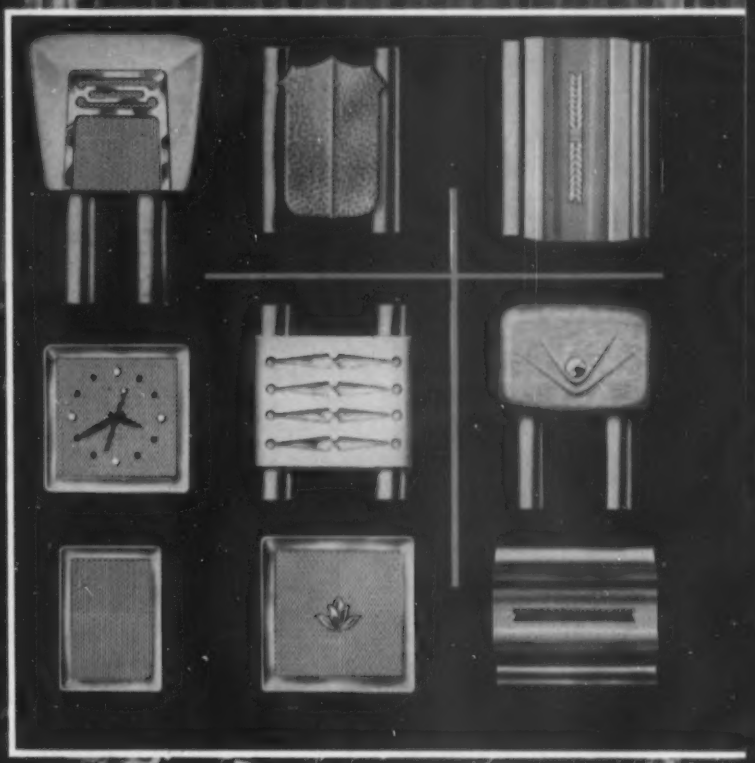
The Federal Reserve Board holds much of the key to this problem. By the tremendous power given to this independent control force it has the power to leash or unleash tremendous monetary or credit forces thus serving as a stimulant or deterrent to economic activity. Such powers when aligned with a sound governmental policy of economic control can well maintain a balanced economy in much the same pattern as has been evident during the past three years. And with no greater inflation present. With political conventions around the corner and a heated national campaign due in the fall, one can expect that all government efforts will be bent in this direction.

One danger signal

The principal cause for disagreement recently between the Federal Reserve and the Administration was the build-up of excess inventories by several important industries, such as the automobile manufacturers. None had reached a serious stage at that time, but the Federal Reserve Board was taking no chances of another 1948-49 or 1953-54 recession. As a result some action seemed imperative to the bankers. The hue and cry raised immediately by the Treasury and others has led many business analysts to review the situation. Now that restrictions have been eased somewhat it might appear that although there are some trouble spots in the economy they are not presently serious enough to affect the system adversely.

Dr. Bunting is a well-known economist and educator having special knowledge of the South.

progress



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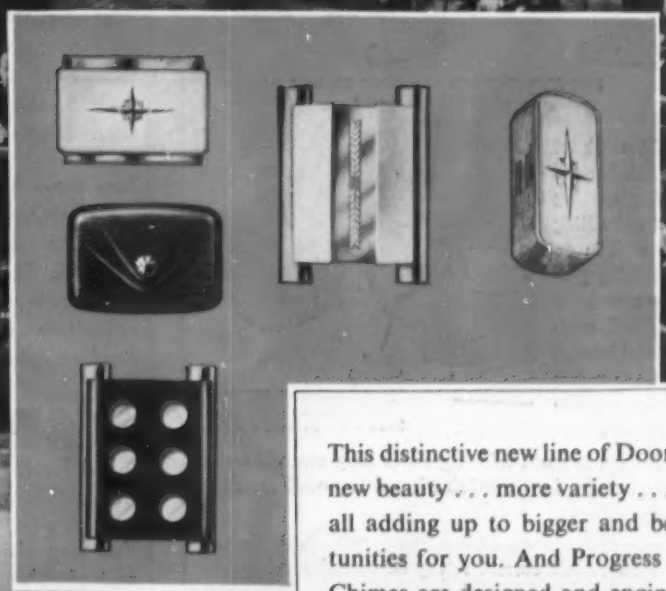

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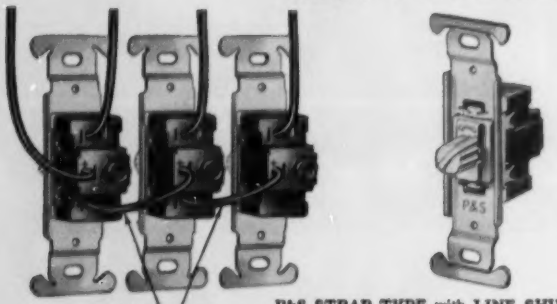

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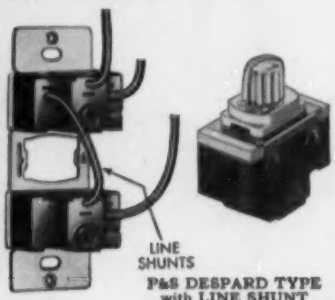

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National Industrial Service Association, Inc. Fred B. Wipperman, Executive Secretary, 818 Olive St., St. Louis 1, Mo.

NISA, Southeastern Chapter. M. E. Assalone, Secretary, 235 NW 2nd Ave., Miami 36, Fla.

NISA, Electric Motor Service Association of the District of Columbia. John W. Lainhart, Secretary, 913 E. St., NW, Washington 4, D. C.

NISA, Louisville Chapter. W. C. Krauth, Secretary, 118 S. 1st St. Louisville, Ky.

NISA, New Orleans Chapter. William Dreis, Secretary, 1517 Calliope St., New Orleans, La.

NISA, Mid-South Chapter. Murphy G. Miller, Secretary, 109 Jennings Ave., Knoxville 17, Tenn.

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CATALOGS and BULLETINS

Available Free to Readers of Electrical South upon Request

1011—Electrical Conduits

"Natural Electric Conduits" is the title of the 30-page Catalog No. 603 which describes and illustrates the many types of electrical conduits that are manufactured by National Electric Products Corp., 2 Gateway Center, Pittsburgh 22, Pa.

1015—Squeezon Connectors

The Squeezon, a new compression connector for power lines, is fully described in bulletin "SQ" available from the James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo. The Squeezon features greatly increased electrical and mechanical efficiency.

1019—Service Panels

Information on protective electrical control centers for homes, apartment buildings, service stations, and industrial applications is contained in Bulletin PM-355, "BullDog Pushmatic Electric-Centers," issued by BullDog Electric Products Co., 7610 Jos Campau, Detroit, Mich.

1071—Plugs and Receptacles

Additional loose-leaf sheets for insertion in the Pylet Catalog 1100 are available from the Pyle-National Co., 1354 N. Kostner Ave., Chicago 51, Ill. These pages describe a wide range of plugs and receptacles for special purposes.

1079—Washer Lugs

Krueger and Hudepohl, 3 E. Third St., Cincinnati 2, Ohio, in their Bulletin 8-DF, give information and catalog listings for their complete line of K&H solderless terminal folding double cupped washer lugs. The folder explains uses and applications of all the lugs.

1085—Lighting Fixtures

Eastern presents their most complete catalog, 32 pages of engineered lighting data, including a variety of fixtures for all architectural, commercial and industrial applications. Eastern Fixture Co., Inc., 170 Vernon St., Boston 20, Mass.

1087—Fittings Catalog

The M. & W. Electric Mfg. Co., Inc., East Palestine, Ohio, has available their new 28-page catalog 53, covering Service Entrance Mast Fittings, Service Entrance Cable Fittings, Ground Clamps, Rods, BX and Romex Connectors, Conduit Fittings, Wireholders, Insulators Supports and Cable Racks.

1097—Cord Catalog

A complete 48-page catalog is available from the Cornish Wire Co., 50 Church St., New York 7, N. Y. containing all data on flexible and portable cords, lamp cords, heater cords, cordsets, radio and electronic wires.

1099—Lighting Fixtures

Fluorescent and incandescent luminaires for schools, offices, stores and factories are illustrated in a series of bulletins issued by Curtis Lighting, Inc., 6134 West 65th St., Chicago 38, Ill. The entire series or any individual bulletins may be obtained upon request.

1103—Compression Connectors

Burndy's new Bulletin CR-1A features the new Crimpit technique for all overhead distribution connections. The bulletin provides information on the entire Cripit line, including details of hydraulic installation tooling and accessories. Copy available from Burndy Engineering Co., Inc., Norwalk, Conn.

1107—RW and RHW Wire

"The Ampere Squeezer," a booklet explaining visually the effect of ambient temperatures on current carrying capacities of RW and RHW Wire. Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass.

1109—Anchoring Devices

An illustrated 32-page catalog, No. 65, describing more than 25 anchoring and drilling devices for making fastenings to masonry, is available from the Arro Expansion Bolt Co., Marion, Ohio.

1135—Wiring Devices

Catalog No. 51, containing complete electrical wiring device line of Leviton Mfg. Co., Brooklyn 22, N. Y. is a 96-page thoroughly illustrated one. Included are such features as the Kwik-Change line, with wiring diagrams, a general index, and an index to catalog numbers.

1155—Wire and Cable

Two catalogs—Bulletin RS-5, and Power and Control Cables, No. 24—available from Rome Cable Corp., Rome, N. Y. Power and Control Cables catalog is intended for utility, construction, and industrial sngineering and purchasing personnel as a guide in selection of proper wire and cable types.

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806 Peachtree St., NE **July, 1956**
Atlanta 8, Ga.

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Manufacturers of **WIRE • CORD SETS • FUSES • WIRING DEVICES**

1167—Industrial Lighting

A four-page catalog insert is now available from the Multi Electric Mfg. Co., Inc., 4223-43 West Lake St., Chicago 24, Ill. The leaflet describes Multi's line of lighting equipment and wiring devices, which include floodlights, vaporproof fixtures, and fluorescent and incandescent fixtures.

1169—Lighting Fixtures

Fluorescent and slimline luminaires, for schools, offices, stores, etc. Illustrated in the new catalog issued by Sta-Brite Fluorescent Mfg. Co., P. O. Box 6352, Miami, Fla., may be obtained upon request.

1175—Fluorescent Fixtures

Light & Power Utilities Corp., 1035 Firestone Blvd., Memphis, Tenn., has printed a new catalog of fluorescent lighting fixtures. The new catalog is divided into six sections, each printed in its own distinctive colors. First section is devoted to "General Data" and details of L&P manufacturing.

1195—Kitchen Ventilation

Descriptive eight - page folder, Bulletin 620H, showing typical installations of all models in the Clipper line of ventilators is available from Trade-Wind Motorfans, Inc., 7755 Paramount Blvd., Rivera, Calif. Folder includes dimensional drawings of installations helpful to building and electrical contractors.

1197—Convenience Outlets

Four-page bulletin gives complete information on the new P&S No. 500 for adding extra outlets to existing installations. Everything you need in a single package—no steel boxes required. Available from Pass & Seymour, Inc., Dept. ES, Syracuse 9, N. Y.

1209—Fluorescent Ballasts

Advance Transformer Co., 2950 N. Western Ave., Chicago 18, Ill., has recently completed the compilation and printing of a 20-page catalog on fluorescent ballasts and their use. Included are data sheets on available Advance ballasts and a comprehensive installation and operation section and testing procedures. Copies of the booklet are available on request.

1211—Fluorescent Fixtures

Catalog folder No. 911, "Peerlite by Guth," has been announced by the Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 3, Mo. Copies of this new eight-page booklet are available from the company upon request. The booklet is designed for the lighting specialist, giving complete engineering data and dimensions.

1217—Hinged Louvred Ceiling

Light weight, has no visible supporting tracks, producing unbroken louvre pattern in all directions. Perfect alignment assured—it's prefabricated. Louvred ceiling can be combined with fascia plates to form any architectural pattern desired. Catalog No. 544 has full details including installation instructions. Neo-Ray Products, Inc., 315 East 22nd St., New York 10, N. Y.

1219—Electrical Enclosures

Catalog No. 5354-U is a 66-page catalog describing the complete line of steel and aluminum electrical enclosures manufactured for utility use by the B & C Metal Stamping Co., 590 Means St., N. W., Atlanta, Ga. The catalog is well illustrated and contains complete specifications as well as prices on all items in the B & C line.

1223—Circuit Protection

A 24-page illustrated handbook contains suggestions for selecting the right kind of protection for electric circuits, motors, appliances and apparatus. Includes motor wiring diagrams and a complete list showing proper size fuses to use. Available from Bussman Mfg. Co., University at Jefferson, St. Louis 7, Mo.

1227—Conduit Fittings

A new complete 48-page catalog conduit fittings and lighting parts illustrating their complete line of for the electrical wholesaler has been made available by Elliott Electric Products Co., 1513 Olmstead Ave., New York 62, N. Y.

1229—Switch and Outlet Boxes

A new RACO General Catalog is now available listing detailed information on boxes, covers, and bar hangers. The catalog includes data on number of wires permitted per box and a list of comparative catalog numbers. Copy available from All-Steel Equipment, Inc., Aurora, Ill.

1231—Conduit

A handy, pocket-size booklet illustrating and describing four ways to greater conduit efficiency and lower installation costs has been published by Youngstown Sheet and Tube Co., Youngstown, Ohio.

1233—Troffer Catalog

A 36-page catalog, with complete information on their newly de-designed architectural troffers has been released by Smithcraft Lighting Division, Chelsea, Mass. Divided into sections for selection of lighting units, the catalog gives complete illustrations and data for 1 and 2 foot troffers in all types of ceiling construction. Also included in the catalog is information on ceiling lighting patterns, shielding designs, lighting techniques and applications.

1235—Improved Heating

Literature, selling tips, and other material of interest to the electrical contractor and dealer are available from Marviray, Inc., 54 Clifton Street, Newark 5, New Jersey. Leadership advatnages of the new Marviray radiant electric wall heater with the anodized aluminum heating surface are described.

1237—Wireholders

Knox Porcelain Corporation, Knoxville 1, Tenn. has recently redesigned a one-piece metal base style reinforced wireholder, No. 5009. Base and screw are hot dipped galvanized. This wireholder has extra sharp threads and quick starting point to make driving easy. KNOX manufactures a complete line of Porcelain Wireholders, House Brackets, and other Secondary Service Materials.

1239—Heavy and Light Duty Power Derricks

J. H. Holan Corp., 4100 W. 150th St., Cleveland 11, Ohio, has available a 4-page catalog on the Series 4700 Power Derrick—a light-duty derrick that lifts loads to 6500 pounds, poles to 55 ft. They also have available a catalog on 3700 Power Derrick containing data on derricks for lifting poles up to 75 feet long and loads up to 12,000 pounds.

1241—Fans

A convenient file folder covering attic and industrial ventilating fans, up to 108" diameter, is available upon request from American Coolair Corporation, Box 2300, Jacksonville 3, Florida. The attractively illustrated catalog pages are bound into the folder, which is available with or without list price sheets.

1243—Lighting Fixtures

The Alkco Catalog for 1956, illustrating their complete line of fluorescent and incandescent lighting fixtures, has recently been released by Alkco Manufacturing Co., 4242 Lincoln Ave., Chicago 18, Ill.

1245—Exhaust Fans

Two new two-color illustrated four-page catalogs (Bulletin Nos. 6414 & 6514) describing the new Model G Ventura fans for business and commercial exhaust applications and Model K for industrial heavy-duty exhaust applications are now available from American Blower Corp., Detroit 32, Mich.

1247—Packaged Service Center

A chart for selection of Uni-Pak interiors, back boxes, and panels, as well as complete information on these products, is now available from Walker Electric Company, Inc., 125 Bennett, N. W., Atlanta, Ga.

1249—Knox Wiring Devices

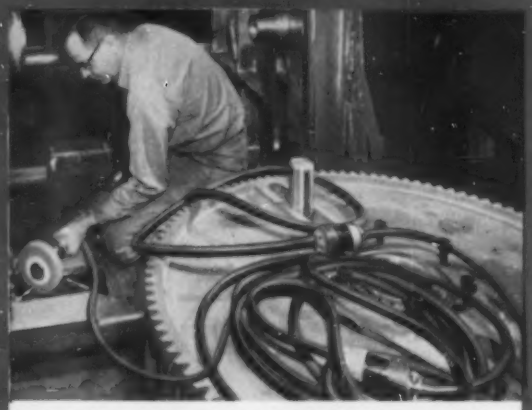
A recent catalog published by Knox Porcelain Corp., Knoxville 1, Tenn. gives complete information on their line of wiring devices, fuse blocks and cutouts, neon sign insulators as well as standard porcelain and electric fence equipment.

1251—Radiant Heating Cables

Three folders, describing Ceilheat's three types of radiant cables, are now available from Ceilheat, Inc., 5212 Homberg Dr., Knoxville, Tenn. One folder features the Aristocrat radiant cable for plastered ceilings, another describes Ajax radiant cable for concrete floors, and the third describes Dri-Cell radiant cable for dry-wall construction.

US RUBBER

Laytex® Royal Master Electrical Cords



Portable grinder equipped with U.S. Laytex Royal Master Cord. Note that it must resist dragging over sharp metal edges . . . and its extreme flexibility.

Electric wrenches equipped with U.S. Laytex Royal Master Cords apply studs to bottom base of braider. Cords resist chemical action of oil, white lead.

Hand-drilling hole in a braider. Note the high flexibility of U.S. Laytex Royal Master Portable Cords in confined spaces.

"The answer to a plant electrician's dream . . ." says a leading maker of braiding machines.

"Before June 1954, we were repairing and replacing the electrical cords on our portable electric drills, wrenches and grinders every six months," says the plant's chief electrician. "The cord jackets were easily bruised and weakened, or even cut. What with being dragged over the floor and around sharp intersections, any tape repairs didn't last long. Then, there were fire hazards and chances of blowout.

"When U.S. Laytex Royal Master Portable Cords were demonstrated to us, and installed, the problem was licked. The cords have a jacket that stands up under our most demanding conditions—and even though their internal wires, insulators and separators are heavily reinforced, the cords still have high flexibility.

"Our men usually pick up the tools by grasping the cord as a handle. Standard cords pulled loose after a short time, because of inability to take constant flexing, and support weight of 15- 25-pound tools. We've found that not one U.S. Laytex cord has pulled loose since installation."

U.S. Laytex Royal Master Cords are unquestionably the crowning achievement in portable cords, unsurpassed in performance *and* economy. Obtainable from your "U.S." branch, your distributor, or write us at Rockefeller Center, New York 20, N.Y.

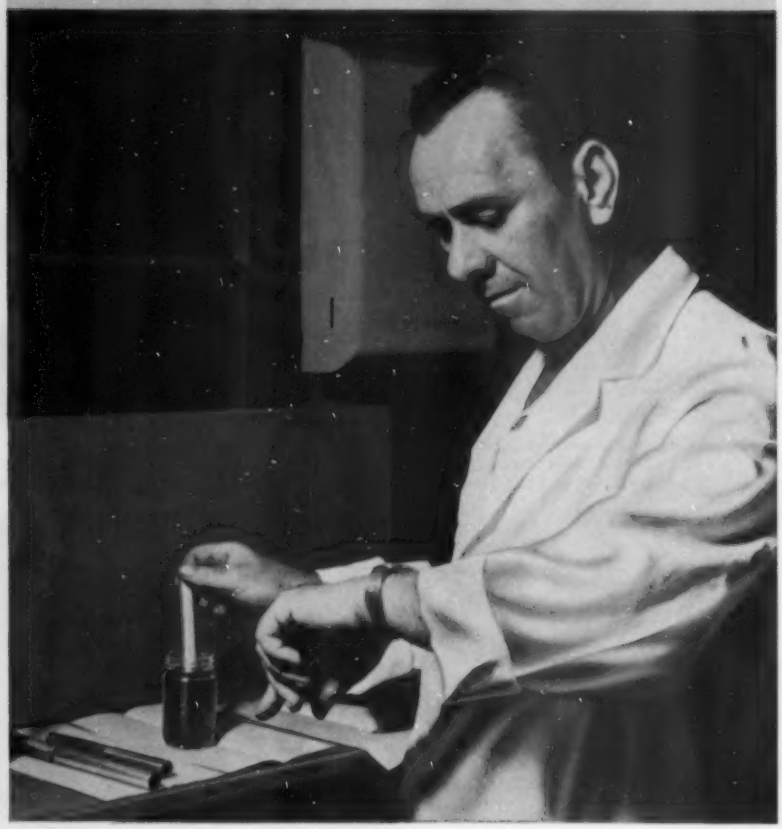
US RUBBER

Electrical Wire & Cable Department

United States Rubber

JOE tests the SPANGLEAM finish for YOU!

This is Foreman Joe Wojtalewicz, a member of SPANG's inspection team at Etna. He checks the plating thickness of each lot of SPANGLEAM EMT by means of the Preece Test to be sure the finish more than meets minimum requirements, giving you a top-quality finish on your SPANGLEAM order.



You don't know Joe Wojtalewicz, but he is one of your personal representatives at SPANG's Etna Plant. Joe makes sure the SPANGLEAM EMT you order has a *top-quality* finish that more than meets the requirements of Underwriters' Laboratories, Inc., American Standards Association and Federal Government specifications WW-T-806b. Here's how he does it.

The Preece test

From each lot of SPANGLEAM EMT produced, Joe chooses a length at random and subjects a small sample of it to the Preece Test. The sample is dipped in a UL-prepared solution of copper sulphate for one minute and then washed in water. This is repeated three more times.

If the finish breaks down during the test, the entire lot is discarded. But if the finish passes, Joe okays the lot for shipment. SPANGLEAM finish will generally stand more dips than required by Underwriters' Laboratories. That's proof of SPANG's *quality-control* manufacturing!

Careful control means better installations for you

Because SPANG maintains such close control on finishing SPANGLEAM Electrical Metallic Tubing, you benefit three ways:

1. The SPANGLEAM finish stands up under the severest bending strains . . . will not crack, chip, flake or peel.
2. The fine plating finish gives SPANGLEAM EMT excellent corrosion resistance . . . prolongs the life of wiring installations.
3. In exposed locations, the lustrous SPANGLEAM finish makes a neat, attractive appearance.

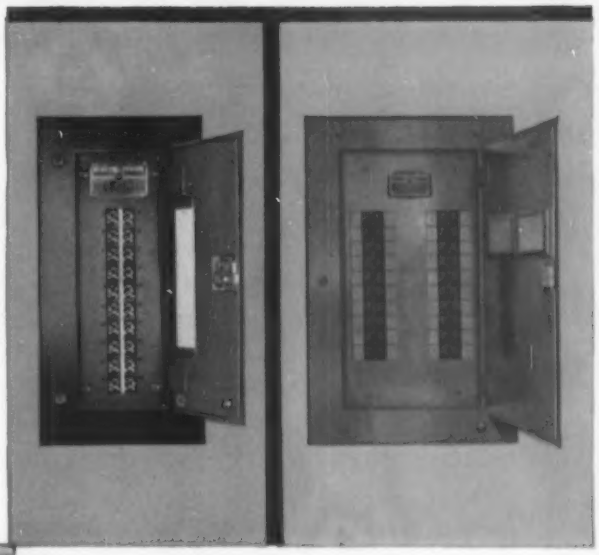
If you haven't used SPANGLEAM EMT, try it now and get the benefits of SPANG *quality-control*. Ask your nearby SPANG Distributor for SPANGLEAM on your next EMT order. You'll know it has Joe's okay!

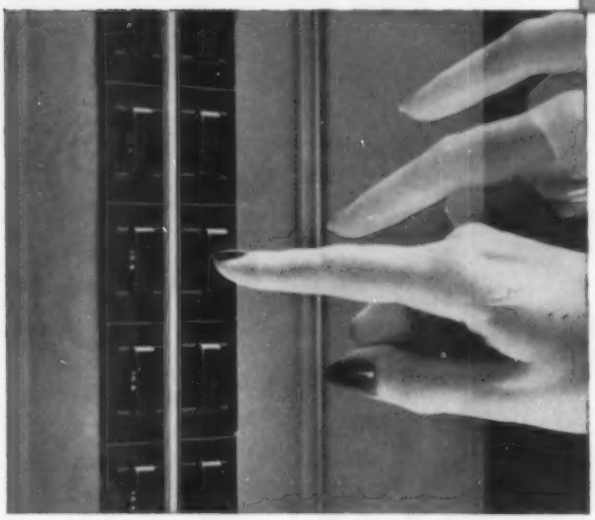
SPANG CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
TWO GATEWAY CENTER, PITTSBURGH, PA.
District Offices and Sales Representatives in Principal Cities

PD ELECTRI-CENTERS, serving 14 to 20 branch circuits, are general-purpose control centers. Used universally for industrial, commercial and residential applications.

P2 ELECTRI-CENTERS, serving 28 to 40 branch circuits, are ideal for large commercial and industrial installations "Custom-built" quality, versatility at standard price.





Two-way circuit protection, double convenience, too!

Duo-Guard Pushmatic Electri-Centers are tops for safety, versatility

The best way to serve your client and yourself is with superior equipment . . . and BullDog Electri-Centers® offer significant advantages to all. From ample wiring space to the Duo-Guard Pushmatic® Circuit Breakers, the entire Electri-Center is engineered for safety, convenience and easy installation.

Pushmatics provide double protection for branch circuits—guarding them *thermally* against normal overloads and *solenoid magnetically* against high overloads and short circuits. With Duo-Guard Pushmatics, fuse changing is eliminated—just a push of the button restores service immediately! Duo-Guard Pushmatics fit any BullDog Electri-Center panel. They meet all four applications . . . residential, commercial, institutional and industrial. Therefore, you can simplify your installation problems with Duo-Guard Pushmatics.

You'll find it pays to promote Electri-Centers—call your nearby BullDog field engineer for the facts, or write BullDog Electric Products Company, Detroit 32, Michigan.

© BEPCO

IF IT'S NEW . . . IF IT'S DIFFERENT . . . IF IT'S BETTER . . . IT'S **BULLDOG**

ELECTRIC PRODUCTS COMPANY

A Division of I-T-E Circuit Breaker Company

Export Division: 13 East 40th Street, New York 16, N. Y. • *In Canada:* BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Road, Toronto 15, Ont.

CONSULT THE FOLLOWING SOUTHERN REPRESENTATIVES:

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2930 Commerce St., P.O. Box 1725
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WILSON ELECTRICAL EQUIPMENT CO.
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2401 Federal St., P.O. Box 1138
Dallas 1, Texas

WALKER ELECTRICAL CO., INC.
125 Bennett St., N.W., P.O. Box 8, Sta. D
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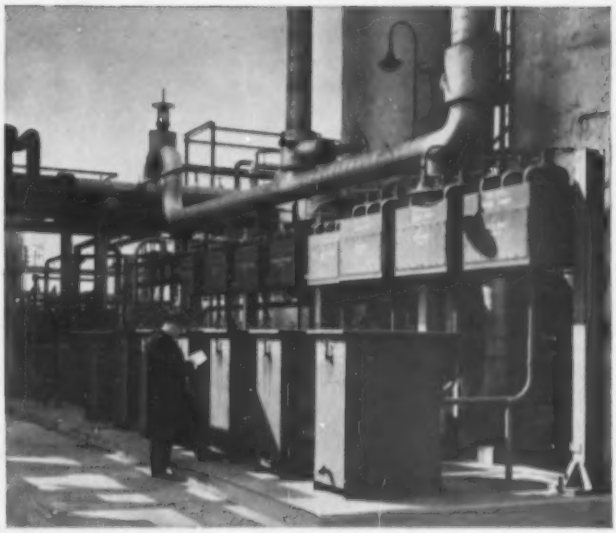
GENERAL CABLE HITS THE TARGET on Delivery and Service!

Making your job easier and better, General Cable backs up distributors unconditionally with 'round-the-clock support, hits the target with quick delivery and dependable service on every job. GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York 17, New York. Offices and Distribution Centers Coast-to-Coast.

be specific . . . **specify GENERAL CABLE**

COMPLETE LINE of G-E oil-filled cutouts includes pole, pothead and subway types and metal-enclosed assemblies.



INDUSTRIALS, such as this oil refinery, use these three-phase metal-enclosed G-E oil-filled cutout assemblies to protect equipment.

UTILITIES with underground systems use G-E oil-filled subway-type cutouts for single phase or three phase, gang-operated, fusing or switching. Expansion chambers are required to secure full interrupting rating.

For best in low-cost switching...industrials, electric utilities choose G-E oil-filled cutouts

Indoors or outdoors, they permit substantial savings on first cost and fuse replacement—combine high interrupting capacity, safer operation and long life

For utility, industrial, commercial and institutional applications that combine overcurrent protection and load-break switching, more and more companies are choosing General Electric oil filled cutouts.

HERE'S WHY: Low-cost G-E oil-filled cutouts provide high interrupting capacity . . . up to 11,000 rms amperes. They provide for maximum safety of personnel . . . all arcing occurs under oil and all flame, noise and electrically live parts are confined within a metal housing. And G-E oil-filled cutouts offer long service life since interrupting ratings are based on test conditions far more severe than those normally encountered in operation.

IDEAL INDOORS OR OUTDOORS G-E oil-filled cutouts are quiet in operation, and they may be wall or direct-to-equipment mounted. Single- or three-phase metal-enclosed assemblies provide for all wiring and electrical connections to be completely enclosed in a grounded steel cabinet. Entrances can be provided for connection to outgoing cables.

Other G-E oil-filled cutout features include:

- Simple fusing, even on gang-operated assemblies. Preformed fuse links easily slip into place.
- Silver-plated self-aligning contacts of heavy forged copper with special arcing tips . . . minimize wear.
- Leads brought into cutout housing above oil level—no gasketed joints under oil pressure.
- Pole and pothead types do not require expansion chamber for full interrupting capacity.

If you have an application that requires overcurrent protection *plus* load-break switching, it will pay you to investigate G-E oil-filled cutouts. Available for 2400-, 4330- and 7200-volt circuits, they can mean substantial savings in initial costs and fuse replacements.

For complete information, contact your nearest G-E Apparatus Sales Representative, or write for bulletin GEC-863, General Electric Company, Schenectady 5, N. Y. 433-12

Progress Is Our Most Important Product

GENERAL ELECTRIC

Plastic used effectively

New ideas in lighting at Dallas' Statler Hilton make dramatic use of versatile translucent acrylic plastic by blending its utilitarian and decorative characteristics for illumination that is interesting and attractive, yet soft and glare-free.

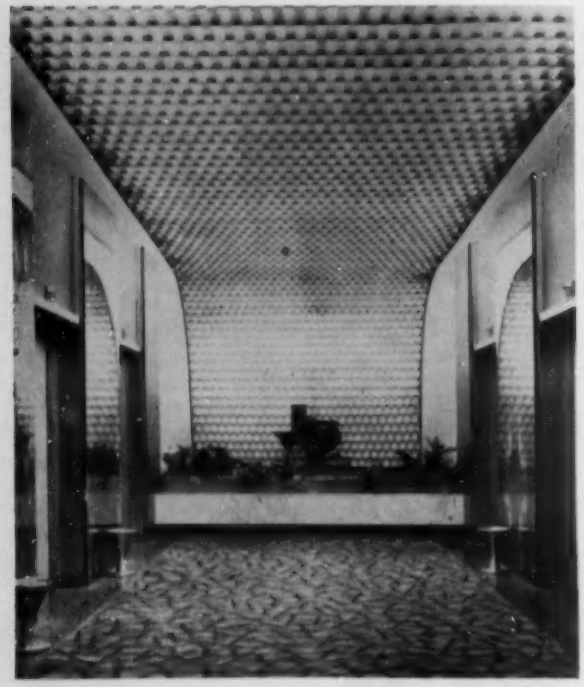
◆ THE RECENTLY OPENED Statler Hilton Hotel in Dallas contains some unusual concepts in techniques of lighting public spaces. Hilton architects, by taking advantage of the even, softly diffused illumination provided by translucent acrylic plastic, and its ability to be formed and joined into interesting configurations, devised a number of ingenious, attractive, and yet highly practical, lighting ideas.

These ideas are embodied in the use of different types of Plexiglas acrylic, manufactured by the Rohm & Haas Co., Philadelphia, Pa., including translucent white, colored, patterned and clear material. The custom forming of the acrylic required for the various lighting arrangements was done by Solar Plastics Products Inc., Brooklyn, N. Y., which specializes in fabricating plastics to architects' specifications.

Basket-weave ceiling

Perhaps the most unusual approach to illumination is the basket-weave luminous ceiling and end wall of the elevator lobby. The 40 x 8 ft sweep of the ceiling develops an interesting combination of texture and soft white light which blends gracefully with the simple lines of the lobby. The ceiling is constructed of 2-inch strips of ⅛ inch thick translucent white acrylic preformed and woven around ovoid brass bars spaced at 6-inch intervals. The ends of the bars are supported by steel channels fabricated in 3-foot sections which are invisibly joined at the top. Each section is supported on wires and can be lowered for replacement of fluorescent tubes.

All joints in the acrylic strips are cemented at the points where they pass over the brass rods so as to be invisible from below. To keep the fluorescent tubing invisible through the openings in the weave, 3 x 4 foot sheets of ripple-patterned Plexiglas are mounted (on plastic supports) between the woven strips and the lights. The end of the corridor, where the ceiling pattern is continued down the wall, provides effective back-



This basket-weave illuminated ceiling in the elevator lobby at the Statler Hilton Hotel in Dallas is fabricated from dozens of 2-inch wide strips of translucent white acrylic plastic woven around brass rods.

Unusual lighting treatment in the elevators consists of rows of frosted colorless acrylic plastic buttons back-lighted by fluorescent tubes in ceiling. Buttons in the back wall are red and amber interspersed.

in Dallas hotel lighting

lighting for a silhouette of the State of Texas. The outline, approximately 2½ feet across, was cut from a ¾-inch thick sheet of smoky-gray translucent acrylic, and is supported about 12 inches away from the wall by 1-inch steel bars screwed onto studs on 3 x 3 inch metal plates on the back of the plastic. A backlighted 2-inch star fabricated from clear acrylic represents the location of the City of Dallas.

Glowing dots

Hundreds of clear and colored acrylic buttons are used for unusual lighting and decorative effects in the five passenger elevators that serve the hotel. Almost 1700 of these buttons are inserted at 2-inch centers in the 5-foot wide perforated stainless steel panels which surface the ceiling and rear wall of the car. Each button consists of a short length of Plexiglas rod mounted on a small flat square of the same material. The color of the supporting square —red, amber and colorless are used —determines the color of the light transmitted through the button into the car.

The car is lighted mainly by the rows of colorless buttons in the ceiling and in the uppermost section of the back wall with six T-12 fluorescent tubes mounted above the ceiling panels. A slimline tube in a trough over the doorway furnishes additional light. The faces of the buttons, which project about ⅛ inch through the stainless steel panels, are given a sand-blast finish so that they appear as a matrix of softly glowing dots of light which harmonize effectively with the brush finish of the stainless steel.

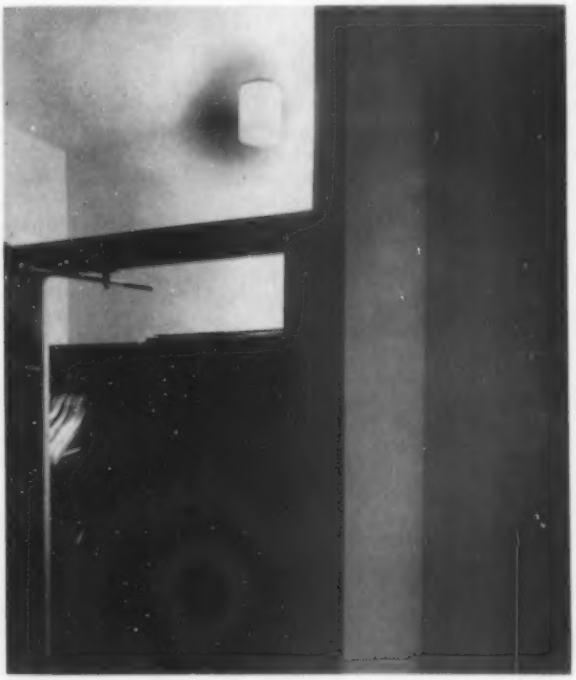
Below the clear buttons on the back wall are about 9 rows of amber-toned buttons which, being more distant from the light sources in the ceiling, transmit a pleasantly-tinted but less intense light. The lower 5½ feet of back panel contain amber and red-toned buttons, inserted in a random pattern, which pick up reflected light in the car and transmit faint vari-colored highlights. The over-all effect when one enters the car is softly diffused white light from many small glowing surfaces, fading into amber and then, lower down, a random pattern of amber and red glints.

Abstract art

Strips and squares of vari-colored translucent Plexiglas combined into a pleasant abstract pattern of color and line are used to add interest to the 40 foot expanse

(Continued on page 107)

Abstract pattern composed of gray translucent strips and colorful squares of yellow, blue, green, red, and white acrylic plastic add interest and color to the 40-ft. illuminated ceiling over cashier's desk.



Cylindrical acrylic plastic diffusers eliminate dim recesses in guest room closets with even, glare-free lighting. Impact resistance of plastic solves breakage problem common with standard fixtures.

Furnishing "sleeve" to new home builders promotes future air conditioning market

◆ FURNISHING speculative builders of homes in the $18,000 or better classifications with a $20 "sleeve" which makes possible immediate installation of air conditioning of from two to ten tons is the unique method by which Hampton Electric Company, St. Louis, Missouri, is laying the ground work for a profitable future volume of residential air conditioning.

The clever plan was evolved by Carl Muno, head of the air conditioning division, and E. H. Woestendick, veteran St. Louis electrical contractor who has built Hampton Electric Company into one of the largest in the state. Both realize the excellent potential of central air conditioning, particularly in cities which swelter under the high temperatures and humidity which are commonplace in St. Louis each year. Consequently, an arrangement was worked out whereby Hampton Electric Company can readily capitalize on its long service to St. Louis building contractors, to "plant the seed" for future installation of central air conditioning in literally thousands of better class St. Louis homes.

Building future sales

Mr. Muno, a veteran of many years as an executive with one of Chicago's largest air conditioning contractors before joining forces with Mr. Woestendick, has tailored a system designed to capitalize on the fact that while air conditioning at first glance seems a prohibitively expensive luxury to the purchaser of a new home, his desire to buy will grow in direct proportion to his better income and as the initial costs of the new home are cut down.

Thus Hampton Electric Company is cheerfully "gambling" $20, represented by the cost of a sheetmetal "sleeve" and installation, on the likelihood that the majority of purchasers of homes in the $18,000 and up classification will shortly be earning enough to go ahead with the air conditioning installation.

There are two obvious advantages in the plan as Mr. Woestendick and Mr. Muno see it—that the home owners willingness to install central air conditioning will increase as his equity in the house grows, and second, that the industrial prosperity which has featured St. Louis for the past ten years will contribute to greater incomes, and consequently, a far greater buying potential on the part of young executives who are the principal purchasers of $20,000 homes.

As the plan operates, Hampton Electric Company, as a Typhoon dealership, agrees to supply the building contractors with an anodized sheetmetal sleeve, which can be fitted directly on top of the home air heating system, or for that matter, anywhere along the duct work so long as it is in advance of the first outlet. Into this sleeve, at any time, Hampton Electric Company can insert cooling coils for two-, three-, five-, or eight-ton cooling units with the compressor, either water cooled or air cooled, readily installed in a bonderized metal housing outside the house where it does not take up basement space.

All of the costs are borne by the St. Louis electrical contractor and in return the builder is required only to permit a decal, specially made up for the air conditioning department to be glued on the sheetmetal housing where it will be a "silent salesman" effectively until air conditioning is at length installed.

Company decal

The decal is a 6 by 3½ inch three-color type produced in St. Louis to Mr. Muno's specifications. The printed message reads "This system is equipped with a Typhoon air conditioning housing . . . for future air cooled or water cooled air conditioning by Hampton Electric Company." In bright yellow and blue, the decal is not only a constant reminder that air conditioning can be installed without expensive alterations or delay, but likewise, is a strong selling point for the speculative home builder.

"Despite the fact that comfort air conditioning is a definite asset in any home, the difference which its installation makes in the sales price of the home is a serious matter," Mr. Muno indicated, "to the point that the contractor who must watch his costs closely invariably hesitates to add another $1,500 or so to the price of the home. Few of them are thus willing to increase the price of the home to the point that its saleability is affected. All of them are willing, however—and that's the major point of our sales program—to incorporate facilities for later air conditioning installation, which add additional luster to the home without extra expense to the contractor.

Easy installation

"The contractor in showing the home makes it plain that air conditioning can be installed swiftly and efficiently without breaking into the routine of the home at any time, and this, of course, carries a lot of appeal to the rising young businessman-owner whose desire to install comfort cooling will be considerably heightened after he has spent a torrid summer in the new house. We hope that by this time, too, his income will have increased to the point that he can add air conditioning costs to his mortgage or to work out a separate contract."

The majority of builders with whom this long-range agreement has been worked out to date are those who depend upon Hampton Electric Company for residential wiring, and particularly, large-scale contractors who are building major housing projects involving large numbers of homes. For example, the biggest sleeve installation to date has been in a group of

(Continued on page 106)

Baylor stadium floodlighting

◆ MOST ROOTERS for Baylor University's fighting Bears no longer apologize for the fact that their team hasn't won a Southwest Conference Title since 1924. They expect that event to occur within the next few years now that the Bears finally have a home stadium worthy of their mettle. Located on a 100-acre landscaped tract two miles from the business district of Waco, Texas, is the new Baylor Stadium—a $1,500,000, steel-reinforced concrete structure that seats 50,000.

Until now, Baylor had only a small playing field (14,000 capacity), consisting of nothing more than wood stands, a cramped press booth, and a few meager floodlights. Faced with the problem of limited ticket receipts at home games, Baylor athletic officials worried annually about traveling expenses, since most games were played in the big stadia of the Bear's conference rivals.

Then, in 1949, the University turned for help to its alumni. A half-million dollars was raised by selling 20-year options to choice stadium seats. To provide more cash, a special corporation, formed to finance and construct the new structure, issued up to one million dollars worth of 30-year bonds. Both programs—financial and construction—were completely successful.

Stadium facilities

Surrounded by an ample parking area, the main structure boasts a large, steel-reinforced press box and red wood seats. The side of the press box facing the field is glass-enclosed. Provision has been made for expansion, whereby footings have been constructed to enable additional upper decks to be added to the present stadium that will increase seating capacity by 40,000.

The floodlighting system was engineered by Lockwood & Andrews, Houston consulting engineers, and installed by Paul Wright Electric Company, San Antonio The system consists of 256 Crouse-Hinds 14-degree FLA floodlights which produce approximately 60 footcandles over the playing area, and 24 parking and 16 seating lights.

Baylor stadium is one of the few in the country using floodlights equipped with 1500-watt, G-48 floodlight service lamps. The lamps are operated at 10% above rated voltage to obtain a 35% increase in light output. When used in a FLA #44559 floodlight, this type of lamp produces a beam spread of approximately 14 degrees.

Especially practical for football stadia, 14-degree FLA units were

selected at Baylor over floodlights producing a wider beam for three prime reasons: (1) first costs were less because fewer fixtures and less electrical load were required; (2) since more light is confined to the playing area by very narrow beam patterns, operational efficiency is greater; (3) to provide adequate illumination not only for the players but also for spectators.

Narrow beam floodlights

Since Baylor stadium seats over 50,000 spectators and since the distance from the field to the farthest row of seats and the floodlight poles is 200 feet, narrow beam floodlights provided the best lighting and least glare both on and around the field. Due to the narrow beam patterns, the floodlights not only confine all light to the playing area but also do not throw light into the eyes of spectators.

All floodlights are mounted at a height of 150 feet above the playing field. Eight tubular steel poles support the floodlights, four to a side. Each of four 80-foot poles support 24 lighting units; four other poles—two 60 feet in length and two 80 feet in length—hold clusters of 40 units each. Because the 60-foot poles are mounted on the corners of the press booth, they stand at the same mounting height as the 80-foot poles. On the rear of each pole platform, two floodlights are installed for pre-game lighting and three other fixtures illuminate the parking areas and stadium approaches.

Pier heights vary

To give the stadium lighting a uniform appearance, the heights of piers on which the floodlight poles have been mounted vary so that the bottom cross arms of each pole are at an identical level.

A new primary distribution system for the floodlighting was installed, feeding from an existing service vault to transformers mounted on the floodlight poles. The floodlights are controlled from

(Continued on page 54)

All floodlights are mounted at 150 ft. Parking area is illuminated by floodlights on rear of each pole.

Floodlight system at Baylor has 256 Crouse-Hinds FLA narrow beam floodlights which produce approximately 60 footcandles of light over the playing area. Parking and seating area lights bring total to 296.

Cost-cutting

◆ ASK FRANK PRATTINI what is the most pressing problem electrical contractors face today and he'll quickly tell you it's high costs.

"We're squeezed by prices set competitively on one hand and high taxes plus high operational costs on the other. There's only one item capable of giving; that is high operational costs. We've worked out a number of ways to control them and in some places to cut them."

Mr. Prattini is the owner of Brignac Electric, 3220 Camp St., New Orleans, La. He purchased control of the company in 1955. Before that, he was general manager for five years and over those years has developed a number of ways to implement his cost-cutting campaign.

Bin-stocking

Under this system, which Mr. Prattini admits is not new but which he insists is highly effective when followed faithfully, all materials and equipment—"even hand tools,"—are assembled.

"As soon as a contract is secured, we stock everything needed to complete it and every tool required," he says. "These are stockpiled in a bin. As soon as the truck goes out to the job site, these are

Five effective cost-control ideas have been worked out by Frank Prattini, owner of Brignac Electric.

ideas that worked

carried there. Thus we save driving back and forth, save lost time waiting for material to arrive, and also simplify our purchasing."

Purchasing controls

Mr. Prattini's plan calls for here, too. It isn't always that one wholesaler has everything we need. Sometimes, we need things in a big hurry. On those occasions, when a loss of time means serious spreading his firm's purchasing among several sources. "There is a school of thought which holds that by concentrating purchases at one or perhaps two vendors, better service is secured. More often, good service comes from having many sources contend for a shop's orders. There's a big cost angle loss of money as well, it's the houses from whom we buy regularly that can be counted on to rush us out what we have to have. Thanks to good relations with many salesmen, I'm often able to get a rush delivery made right to the job site by the salesman himself. Occasion for this will happen in the best-run shops because things go wrong from time to time and unexpected needs crop up."

While most of his purchasing is done by careful cost comparison, Mr. Prattini recognizes that there are times when careful buying can mean mounting overhead greater than the seeming savings. For this reason, Brignac Electric has a "short buyer." It is the function of this man to purchase conduit, wire, and miscellaneous material.

There is money to be made in handling small jobs and money to be made doing big work, Mr. Prattini says. But it is seldom, he believes, that one electrical contractor can gear his operations to handle both types efficiently.

Profitable jobs

"They are practically two different markets and a different set-up is required to handle each efficiently," the owner of Brignac Electric points out. "It happens our greatest emphasis is on bigger jobs. There is nothing wrong with small repair and remodeling work; many contractors have made small fortunes on it. When I say we don't go after it, that isn't to say it's bad—merely that it isn't for us. For careful cost accounting shows that with the set-up we have, we merely spin our wheels on small work. Knowing this, allows us to avoid it where possible and so to materially increase the shop's net profit through concentration on the type work that pays us best."

By operating two different types of equipment, Frank Prattini has cut his vehicle operating costs. He has one main truck which is used

(Continued on page 104)

Close purchasing controls save by avoiding overbuying, wastage, or unnecessary tying up of capital.

Close material accounting on every job prevents loss from overage.

The company saves by operating two vehicles, one for job deliveries, other for service and rush calls.

All materials and tools called for in new contract estimate are bin-stocked for delivery in a unit.

Brignac finds salvaged copper and conduit scrap leads to considerable savings over a yearly period.

Industrial applications

Industrial electrical contractors and industrial electricians alike are more and more frequently encountering magnetic amplifiers as a control component of industrial tools and equipment. This versatile device is somewhat mystifying to those unacquainted with it since it is static and consists only of iron cores, windings and dry-type rectifiers. Here is a comprehensive resume as to what it is, how it works, and where it is used.*

◆ THE STORY of magnetic amplifiers for machine tools is the story of regulating systems for machine tools. Regulators need not be peculiar to one specific industry Rather, they are peculiar to a specific function, and that function can be adapted to many industries. By observing the functions which are performed in other industries by magnetic amplifiers, the further use of these devices for machine tools will become apparent.

In all industries, certainly including machine tools, the requirements demand better regulator performance, closer accuracy limits, and greater over-all reliability. Much emphasis has been placed on reliability because of the increasingly greater investment that is dependent upon the successful operation of the regulated system. Maintenance is another facet of the same problem, for it is ever more important that the process be maintained without interruption.

Little maintenance needed

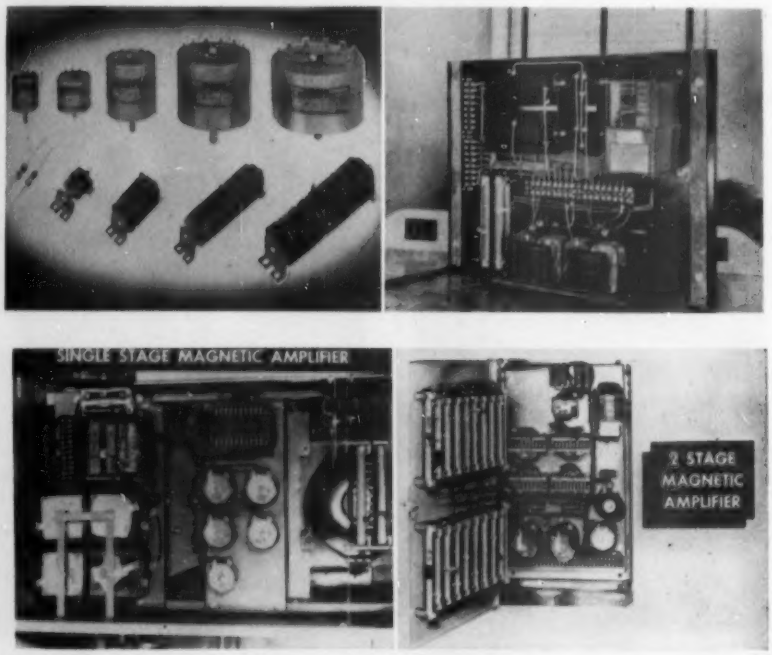
Maintenance and reliability are the very qualities which have focused the limelight on magnetic amplifiers. Since magnetic amplifiers are static devices, practically no maintenance is required. Magnetic amplifiers are composed of iron cores, windings, and dry-type rectifiers. All these components are inherently long lived and invulnerable to normal industrial abuses. Figures 1-4 illustrate the components involved and their packaging in industrial control units.

The pressing need for such a rugged device plus recent developments in the core materials and rectifiers used in magnetic amplifiers, has focused much attention on their problems. World War II and the succeeding years have brought magnetic amplifiers a long way. Better core materials with so-called "square loop" characteristics have been develped. Good dry-type rectifiers are commercially available. The key which really unlocked the application door was the development of the self-saturating circuit, which uses rectifiers to increase amplifier gain tremendously. While the principles of operation of magnetic amplifiers have been known for many years, it was only recently that they have come into widespread use.

Amplifier principle

Let's see first how a magnetic amplifier works. Functionally, this device is a variable reactance placed between the load and its power supply. By means of a small control signal, the reactance can be varied by as much as 100 to 1 with commercially available materials. Likewise, the voltage across the load is varied by the same amount.

To understand simply what goes on inside a magnetic amplifier, recall that the voltage across any reactance is proportional to the rate-of-change of magnetic flux in the iron. Now if the iron saturates, the flux can no longer change and the



Figures 1-4—Shown here are some of the components used in assembling magnetic amplifiers and three typical Magamp control panels.

*Information for this article was furnished by application engineers of the Westinghouse Electric Corp., Pittsburgh, Pa.

# of magnetic amplifiers

reactor voltage collapses. The core is said to have "fired." By use of the d-c control windings, the degree of saturation is pre-set, and thus, so is the point at which the core will reach saturation, or "fire." Note in Figure 5 that if the flux is pre-set to a lower value, it takes longer to get back up to saturation. Thus the core "fires" later and the output is reduced.

All of the circuits to be discussed are of the self-saturating type, which means only that the load winding has a rectifier in series with it. This prevents demagnetizing the core during the negative half cycle. The control characteristic curves for such an amplifier are shown in Figure 6. There is a rather steep linear region to these curves, and it is in this linear region that a gain and time constant are defined. The gain is proportional to the slope of the characteristic curve.

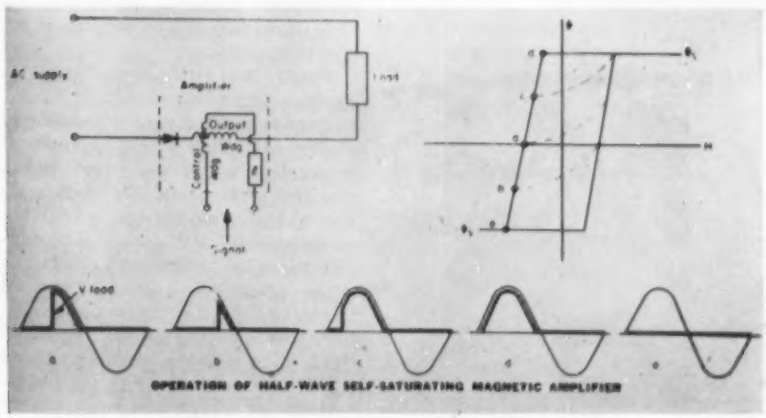


Figure 5—Half-wave saturation Magamp characteristics.

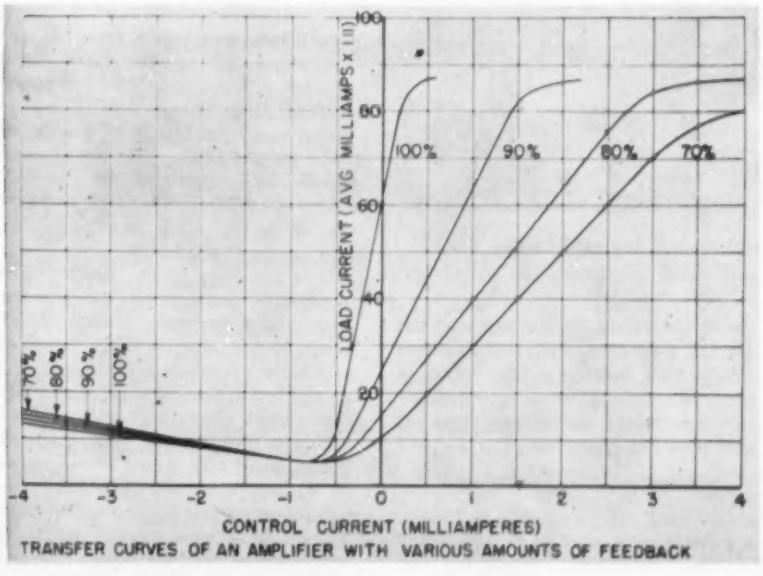


Figure 6—Transfer curves for self-saturating amplifier.

The desired gain can be designed into a magnetic amplifier by proper choice of control winding ratios, or by use of suitable feedback. It is fundamental, however, that high gain comes at the sacrifice of response time. Thus, to obtain fast response, the power gain must be kept reasonably low. This may mean extra stages of amplification for some applications. For example, the gain of a typical toroidal core magnetic amplifier might be 500 with a response time of three cycles. The gain could be made as high as 10,000, but the response time then might be as high as 50 cycles. To evaluate the performance of such a device, we speak of a figure of merit—the ratio of power amplification to response time. This figure of merit is relatively constant over a wide range of designs.

400-cycle supply used

Gain and time constant are characteristics of any amplifier—magnetic, electronic, rotating, or other. With electronic amplifiers the time constant is usually small enough to neglect, at least in most industrial applications. To obtain the same fast response with magnetic amplifiers, 400 cycle supplies are used. In this case, a three cycle delay is less than 1/100 of a second and can usually be neglected.

Like electronic amplifiers, magnetic amplifiers have the basic limitation of non-reversible output. When an application requires a reversible output, two amplifiers may be arranged in "push-pull." In this manner, one unit provides the positive output while the other unit provides the negative output. The "push-pull" scheme results in a theoretical maximum efficiency of only 17 per cent, and is therefore normally restricted to low power requirements. Preamplifiers for reversing applications are often "push-pull" units.

A more efficent but more costly

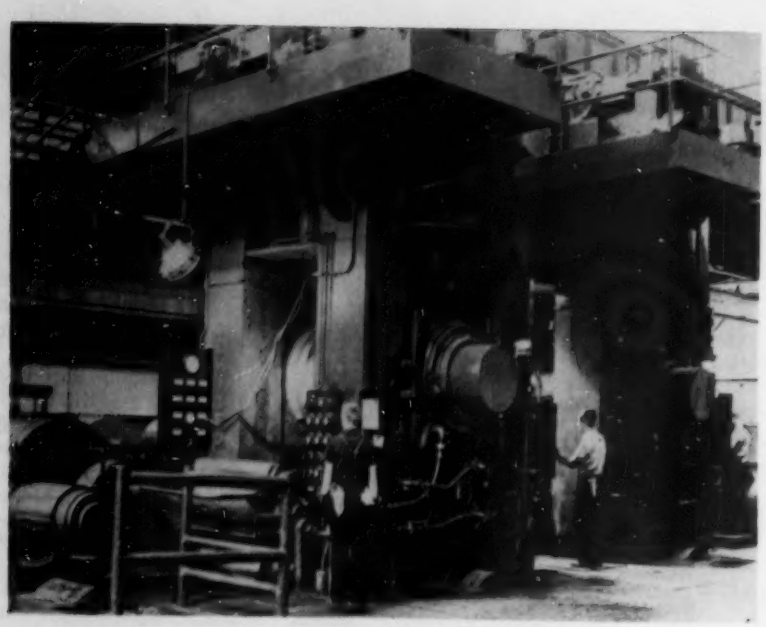


Figure 7—To-stand temper-pass mill for tempering steel strip.

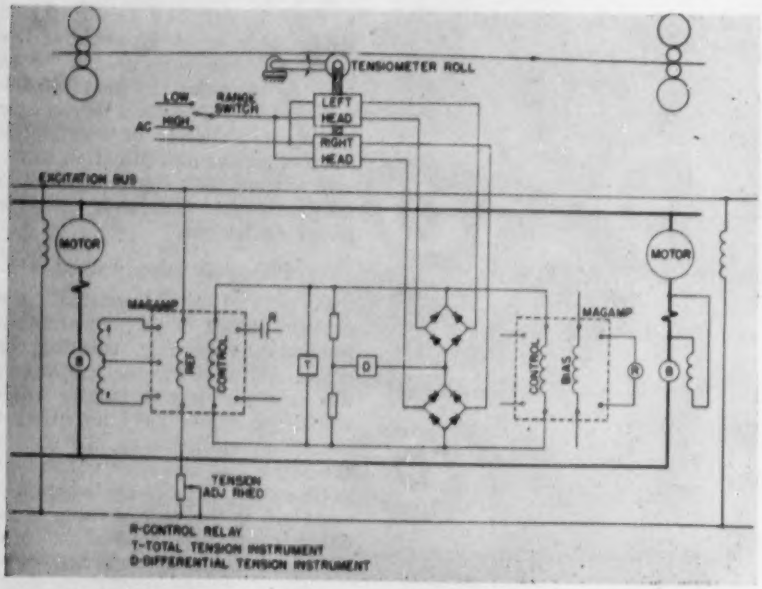


Figure 8—Schematic diagram of control circuit for mill in Fig. 7.

method is to use two independent amplifiers working into separate fields on an exciter or generator. By thus controlling field excitation, the output voltage of the exciter may be varied smoothly from maximum positive voltage, smoothly through zero, to maximum negative voltage. It is well known, of course, that a rotating amplifier includes this feature inherently. While reversing applications may require two amplifiers, there are many applications which do not. Some examples of systems which use single-polarity control are voltage regulators, speed regulators, special computer circuits, and limiting circuits.

"Limiting" applications

Limiting circuits, for example, are very important in regulator systems, especially when forcing action is required to effect fast response. If field forcing is used on the field of a d-c machine to obtain rapid response, the action may be so rapid that dangerous currents will circulate. To prevent this, a current-limit magnetic amplifier can be used to throttle the forcing when the armature current reaches the maximum safe value. If a magnetic amplifier is already being used, say as a speed regulator, one additional winding on the amplifier may be utilized for current limit override. By utilizing suitable control signals, other quantities such as torque, speed, and voltage can be limited in a similar manner.

To consider some specific applications, refer first to Figure 7, which is a two-stand temper-pass mill for tempering steel strip after annealing. The drive requirements are that the tension in the strip be controlled closely. To accomplish this, strip tension is measured by the tensiometer.

Since the strip bears directly against the tensiometer roll, any change in tension causes movement of the roll. This roll movement is converted to an electrical signal and fed to the control winding on the magnetic amplifier, as depicted schematically in Figure 8. The control signal is compared against the tension reference signal, to control the output of the magnetic amplifier. The amplifier works into the field of a booster which changes the drive motor speed in such a direction to return strip tension to its original set value.

Paper mill application

Another application of magnetic amplifiers has made possible the operation of a modern paper winder at the unprecedented speed of 5000 fpm. This winder Figure 9 rectives 17-ton rolls of paper as they come from the paper machine, and operates to produce many smaller rolls more suitable for shipping and handling. Referring to the schematic representation of Figure 10, the surface winder is seen to pull the paper from the core-type unwind stand Braking on the unwind stand is carefully controlled by a braking generator to maintain constant tension in the paper.

For a fixed linear paper speed, the unwind roll speed increases as its diameter shrinks. To keep the tension constant under these conditions, one can show that it is necessary to hold armature current constant. Notice that the unwind tension regulator measures the

current to the braking generator, compares it to a reference as set on the tension rheostat, and controls the generator excitation accordingly.

The booster is used to compensate for IR-drop and to provide tension current when the winder is at standstill. Three auxiliary magnetic amplifiers are shown One provides a slow, regulated speed for threading operations The other two units provide a current-limiting action during acceleration to full winder speed. Thus, the machine is accelerated, and decelerated, as rapidly as possible without circulating dangerous currents.

Automatic operations

Another application which demands the utmost performance from its regulated drive is a modern, high-speed reversing planer. To remove metal most effectively, the planer table must move the work past the cuting tool uniformly at the proper cutting speed. This speed is rather critical if maximum metal removal consistent with good tool life is to be achieved, the speed should also be constant to produce a good surface finish. Since the return stroke does not remove metal, it is desirable to reduce this non-productive time by returning the table at a high speed. For this reason separate "cut" and "return" speed setting rheostats are provided.

During automatic operation contactors C and R are operated by limit switches which detect the position of the work table on the machine ways. Thus during the "cut" stroke, C is energized until a limit switch at the end of the "cut" stroke initiates the "return" sequence. During cutting, however, note the contacts C cause a positive signal voltage to be applied to the control winding of the first magnetic amplifier. Two amplifiers are cascaded to prove additional power gain. The first amplifier obtains the reversing output by "push-pull" arrangement, while the power amplifier obtains output reversal by using opposing fields on the d-c generator.

The speed of the planer motor is obtained by measuring motor back voltage, which is proportional to speed for a constant value of excitation. One winding of the amplifier measures applied generator voltage. The second winding receives a signal proportional to armature IR-drop. The difference

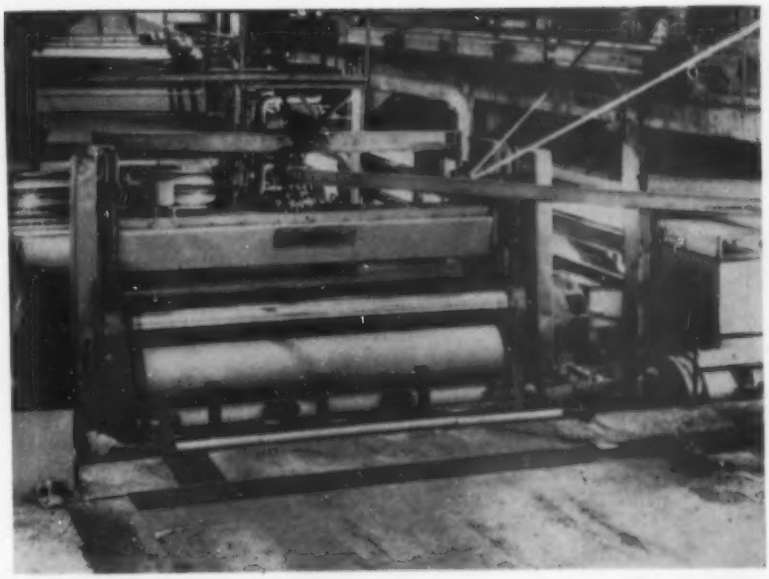


Figure 9—This winder receives 17-ton rolls of paper as they come from the paper machine and rewind into smaller units for shipping.

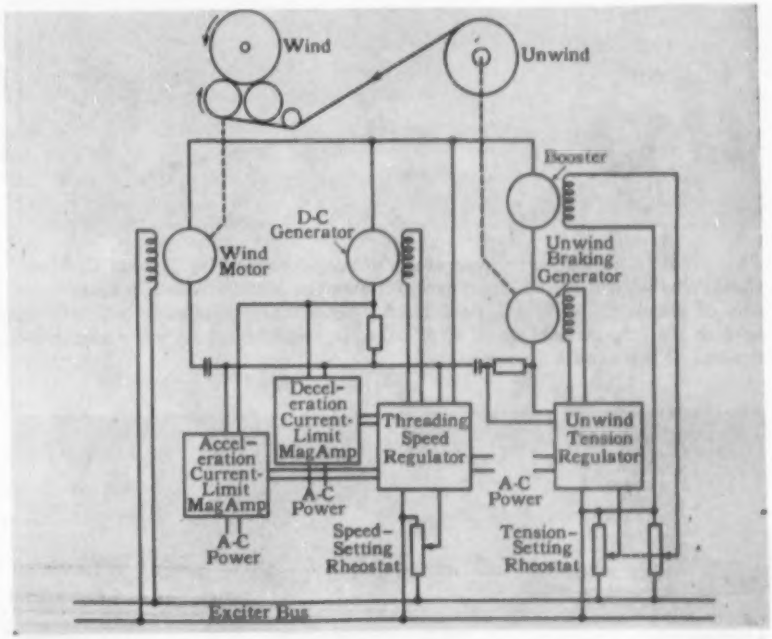


Figure 10—Details of the control used for winder shown in Fig. 9.

of these two signals is a measure of the motor speed, and is compared against the reference signal to produce an amplified error signal. This error signal is applied to the control winding of the power amplifier, whose output adjusts generator excitation to maintain the correct speed.

These applications are but a few of the many magnetic amplifier regulators which have been built. It is important to analyze carefully the functional requirements of the drive to determine the type of regulator which should be applied.

Limitations and advantages

It is well to know both the limitations and strong points of the

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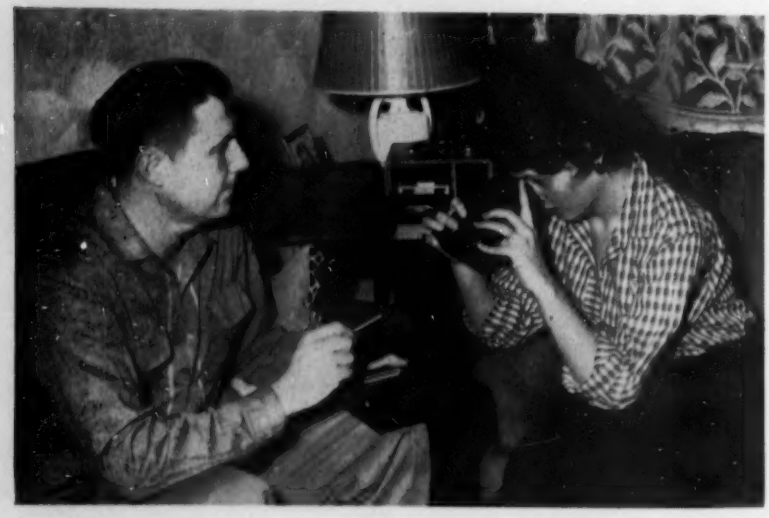
Safe wiring promotion increases volume

ROBERT C. MARSHALL
ELECTRICIAN
IS YOUR HOME WIRED FOR MODERN ELECTRICAL LIVING?
BE READY FOR TOMORROW'S NEW ELECTRICAL APPLIANCES

This electric panel containing 48 switches, designed by Robert C. Marshall, Washington, D. C. contractor, shows the homeowner the amperage size of service equipment needed. A homeowner computes her wiring system load by switching on appliances in her home and watching indications of the needle on ammeter.



A customer studies three-dimensional color views of installations through a viewer. Mr. Marshall, left, takes pictures of all "before" and "after" jobs he handles and uses them as sales aids.

by Beatrice Miller

◆ A CONVICTION that the public is in dire need of education in safe home wiring, and that contractors had not availed themselves of this opportunity, led Robert C. Marshall, electrical contractor in Washington, D. C., to conduct a promotional campaign by leaflet, display, photographs, and personal contact.

Following within two months of the Potomac Electric Power Company's recent promotional program for safe home wiring, Mr. Marshall's company created further public interest by putting on display at the Bank of Silver Spring, Md., a panel incorporating a series of 48 switches designed to show the homeowner the amperage size of service equipment he needs. Constructed by Mr. Marshall at a cost of $1,200, the panel invites people to watch indications of the needle on the ammeter for size of service panel after cumulative load of refrigerator, washing machine, dryer, toaster, and other electrical appliances in their household have been registered by switches. (Mr. Marshall studied a similar panel in use at the Georgia Power Company's Atlanta headquarters.)

The contractor's next step in trying to bring the public up to date was to prepare a pamphlet in simple terms telling in photograph, drawing, and text how modern electrical living increased the need for more wiring, what caused overloading, how to recognize an inadequate wiring system, and how to correct it.

Need for education

"There seemed to be so much effort and millions of dollars put into national advertising and radio, and spent by the local power companies to show how modern living was becoming increasingly electrified with all the new electrical products on the market, and yet no one was explaining to the customer

(Continued on page 102)

Use of 1500-watt flood lights on 30-foot aluminum poles gives an average of 10 footcandles of evenly distributed illumination for the entire area of the new Dale Mabry Branch of Elkes Pontiac Co., Tampa, Fla. The buildings on the extreme three corners are lighted to a general level of 65 footcandles.

Planned lighting spurs auto sales

Lighting techniques created the effects wanted by the automotive firm—"an informal air coupled with the exciting glamour of a downtown showroom. Here, light is one of our best salesmen."

By J. A. Savarese, Lighting Specialist, Tampa Electric Co., Tampa, Fla.

◆ AN ATTRACTIVE LIGHTING INSTALLATION that would make their new suburban showplace stand out above the surrounding competition was the goal of Elkes Pontiac Co., of Tampa, Fla., and lighting engineers of Tampa Electric Co. The 16-year-old agency has been in the heart of downtown Tampa during its successful business life but, due to the current growth of the city, it was decided to open a suburban branch.

This new branch of Elkes was recently opened on the corner of Henderson Boulevard and Dale Mabry Highway, three miles from the metropolitan area and one of the most heavily traveled intersections in Florida. The 40,000 square feet of show area, comprising four buildings and a huge center lot, was carefully studied by Tampa Electric Company lighting engineers and a plan for illumination prepared.

Types of light used

The plan called for the use of 1500-watt flood lights on 30-foot aluminum poles for the over-all lighting. This gives an average of 10 footcandles of evenly distributed illumination for the entire area.

The four structures on this modern automotive showplace were built in the Cape Cod styling, using attractive old brick. Three of the buildings, on the extreme three corners of the triangular area, display the latest model Pontiacs. These structures were lighted to a general level of 65 footcandles, using 4 rows of four, 3-lamp, 40-watt rapid start louvered troffers. The cars on display are highlighted by eighteen, 150-watt R-40 flood units and with these supplemental units a 110 footcandle level was achieved. These incandescent units also bring out the beautiful

(Continued on page 104)

Applying lamp ballasts

Part 1—The tremendous number of types and sizes of ballasts for fluorescent lamps has often confused the lighting engineer, the electrician, and the service man. Here is a comprehensive discussion designed to give a better understanding of ballast application.

By M. E. Robertson, Commercial Engineer, Jefferson Electric Co., Bellwood, Ill.

◆ THE PRODUCTION of fluorescent lamps and ballasts have become major industries in the 17 years since the fluorescent lamp was introduced in 1938. The development of the ballast has followed closely along with the development of the lamps, since one is useless without the other. Ballast manufacturers have, of necessity, worked hand in hand with the lamp manufacturers, since each new lamp requires several new ballasts.

Along with the development of fluorescent ballasts and lamps to their present art, was the development of standards for fluorescent ballasts by CBM, ASA, and Underwriters. The aim of this standardization is to insure the user of safe high quality, efficient low-cost illumination.

The fluorescent ballast cannot be intelligently discussed without also discussing the fluorescent lamp. Each type of ballast is specifically designed to operate a particular type of lamp. Generally, if the wrong lamp is used, either the ballast or the lamp, or both, may be damaged. There are exceptions to this of course. For example, the rapid start lamp may be used in place of the preheat lamp. If an instant start lamp is used in place of a rapid start lamp, the ballast will be damaged.

The following discussions will describe the more popular ballasts and explain how they work and how they differ. It is hoped that through a better understanding of the ballasts themselves, the job of applying the ballasts will be made easier.

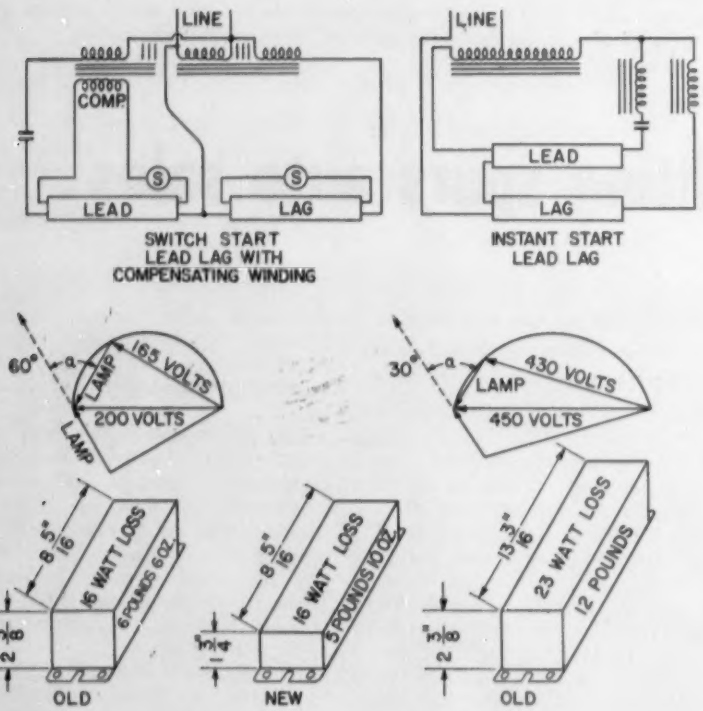


Figure 1—Two examples of two-lamp ballasts are illustrated here with vector diagrams showing voltage phase relations. Figure 1-A at left is the well-known lead-lag ballast for two 40-watt lamps. Old and new dimensions are shown at bottom. Figure 1-B at right is ballast for the slimline, instant start lamps. It is lead-lag type also.

Five lamp types

The more popular fluorescent lamps now in use are the switch start or preheat, the slimline, the instant start, the rapid start, and the circline lamps.

The switch start lamps are those which require their cathodes to be temporarily preheated before the lamps will start. They are bi-pin lamps, and a mechanical starter is required.

The slimline lamps are of the single-pin type and start instantly, without the necessity of the cathode being heated. These lamps require a very high starting voltage, and thus constitute a safety hazard. Underwriters' requires the use of a special lamp holder which de-energizes the circuit as soon as either lamp is removed from the fixture.

The instant start lamps are similar to the slimline lamps except that they are made only in the 48T12 tube and have a bi-pin base. The base pins are shorted inside the lamp, thus the disconnecting safety feature is built into the lamp and standard bi-pin sockets can be used.

The circline lamps are essentially preheat type bi-pin lamps bent into a circle. These lamps can be used with mechanical starters or with trigger start ballasts.

The rapid start lamp is the new-

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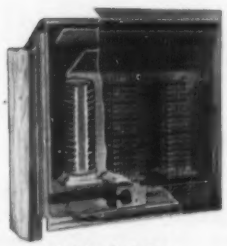

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est of the group. It is available in a 48T12 tube and is rated at 40 watts. There is also a 72T12 one ampere lamp for outdoor use and a 96T12 100 watt high brilliancy lamp. The rapid start lamps have continuously heated cathodes which must warm up before the lamp will start. This warm-up period causes only a very slight delay in starting.

Ballasts matched to lamps

For each lamp, there is at least one type of ballast. Often there are several. The 40 watt preheat lamp, for example, requires a great number of ballasts. It is conceivable that you could get one-lamp, two-lamp, or three-lamp, low and high power factor ballasts with 118 volt, 208 volt, 236 volt, or 277 volt primaries for either 50 or 60 cycles. This amounts to a grand total of 48 possible designs for the one lamp. Multiply this by the number of lamps available, and you can see that the number of ballast designs necessary to fill the requirements of the lighting engineer reach astronomical proportions.

A ballast must be used with any gaseous discharge device such as the fluorescent lamp. The ballast serves two purposes. It provides a high starting voltage to ionize the gas in the lamp, and it limits the current after the lamp has started. Without the current-limiting ballast, the lamp current would keep increasing until the lamp was damaged.

With the exception of the trigger-start ballast, this discussion is limited to ballasts which are intended to operate two lamps. These fall into two classes: one is the lead-lag type, and the other is the series type.

Lead-lag ballasts

The lead-lag ballasts operate the lamps in such a way that the two lamps reach their maximum brilliance at different times during each half-cycle of the supply line. This is accomplished by having separate circuits for each lamp. One circuit includes a condenser which is called the lead branch, and the lamp it operates, the lead lamp. The other circuit includes only inductive reactance which causes the current to lag the voltage. This is the lag branch, and it operates the lag lamp. Therefore, the term, lead-lag.

In order to understand the importance of this, it is necessary to know more about the characteristics of fluorescent lamps. The light output varies during each half-cycle from little light to full brilliancy. A rotating object, such as a fan blade, may appear to be standing still when viewed in such a light. This phenomenon is known as stroboscopic effect. Strobe can be partially corrected by using two lamps and a ballast, which causes them to reach their maxi-

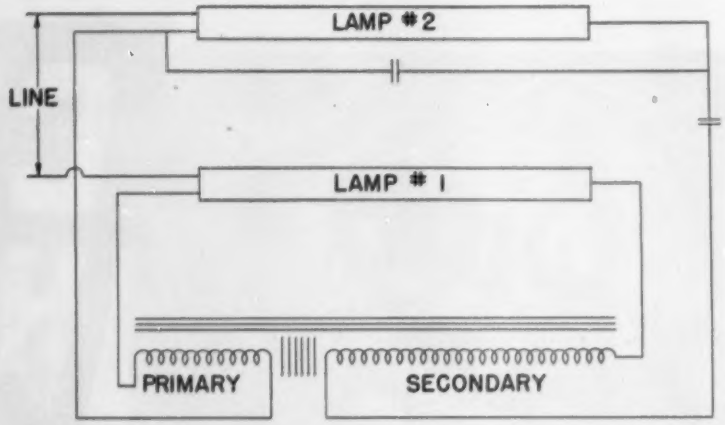

Figure 2—This is the circuit diagram for the early type of series sequence starting ballast. The lamps are in series; condenser shorts one lamp while other starts; then condenser charges to point where it will start the second lamp. This type was not entirely satisfactory.

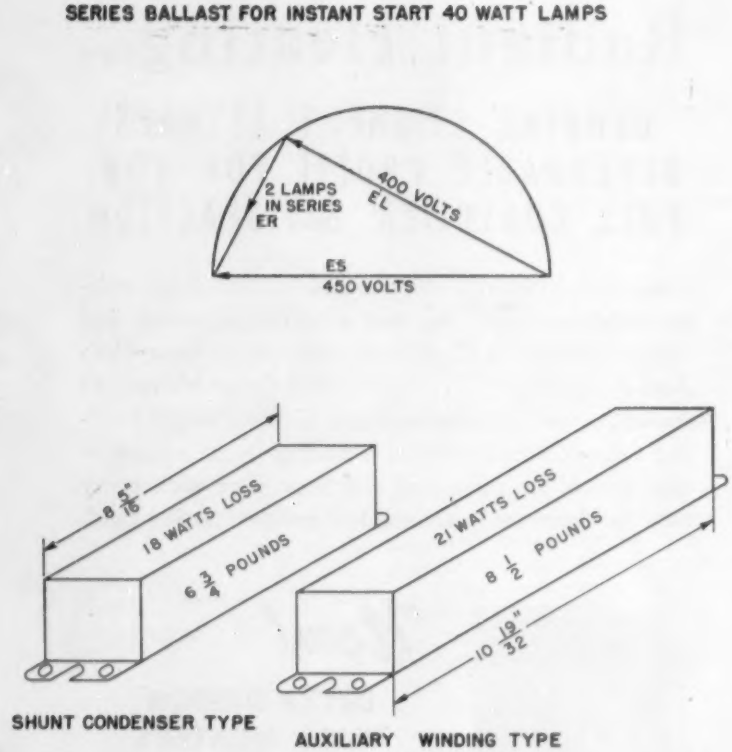

Figure 3—The vector diagram above shows voltage relations for the diagram illustrated in Figure 2. At left below is the physical appearance of this type ballast. To overcome disadvantages of the shunt condenser type, an auxiliary winding type was developed shown at right below.

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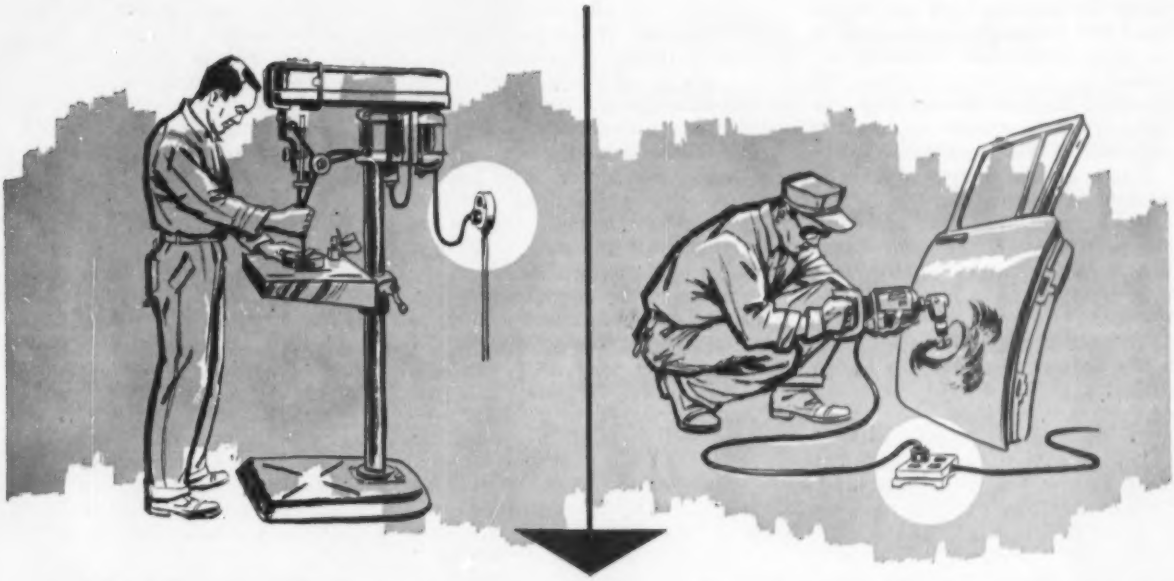

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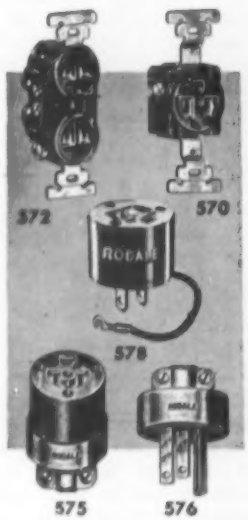

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mum brightness at different times. The ideal two-lamp ballast would be of the lead-lag type and would have 90° phase displacement or a ¼ cycle difference in timing between the lead and lag branches. Lead-lag ballasts for the different lamp types vary from very good to only fair strobe correction.

Lamp manufacturers state that present-day lamps have such improved fluorescent powders that the persistence or light hold-over is sufficient to make strobe correction unnecessary in many applications.

The other class of ballasts, the series ballast, operates the lamps in series, and of course, no strobe correction is obtained.

To get back to the discussion of ballasts, the old standby, the two-lamp 40 watt lead-lag switch start ballast is still very popular for industrial and commercial use, but indications are that it is losing ground rapidly to the newer types.

This ballast is of single core construction and has three coils: the lead reactor coil, the primary coil, and the lag reactor coil. It also includes a condenser for radio interference suppression and a condenser for the lead circuit.

The core and coil unit is rigidly clamped together at each end by means of a spring steel clamp which applies pressure to all four sides of the core. During assembly of the core and coil, cement is placed in the air gaps for further rigidity. The core and coil unit is impregnated with a polymerizing varnish and baked, thus making a solid mass of the unit. This procedure of clamping, cementing, impregnating, and baking insures that the core and coil will be quiet in operation.

The leads are then attached, the unit tested and placed in the case. The ballast is tested again in the case, both before and after filling with compound. The case is poured full of hot asphalt compound which is loaded with silica. This compound completely fills the case, surrounding the core and coil and condenser. The base is then riveted in place, and you have a cool, quiet ballast.

How preheat lamps start

Figure 1-A shows the vector diagram of this ballast. You can see that 200 volts open circuit are required and that 165 volts appears across the lead branch as well as the lag branch of the ballast. The angle alpha represents the strobe correction which is 60° and considered to be very good.

Figure 1-A also includes a circuit diagram of the preheat type lead-lag ballast. The ballast itself includes a primary winding as well as a lead and lag reactor. The lead circuit also includes a tightly coupled compensating winding and a series condenser. The circuit shows the connections for the lamps and the starters. During the starting cycle, the starters connect the lamp filaments of each lamp in series across the proper portion of the ballast. The filaments are allowed to heat due to the current through the starters until the starters open. At this time, the filaments (with a properly designed ballast and starter) are hot enough to allow the lamp to start without damage to the coating on the filament. When the starter opens the starting circuit, the magnetic field, set up in the ballast due to the starting current, collapses inducing a high voltage in the ballast windings. This voltage is sufficiently high to cause ionization of the gas in the lamp which allows current to flow and the lamp lights.

The compensating winding increases the cathode preheating current of the lead lamp. Although it adds to the cost of the ballast, there is a very real return to the user. The compensating winding provides faster, more positive starting, avoids premature end blackening of the lamps, and adds appreciably to lamp life. Lamp manufacturers state that an uncompensated lead branch can reduce the life of the lamp by one-third.

CBM/ETL certification assures that the ballast has a compensating winding and that long lamp life will result.

The block diagram in Figure 1-A shows the brick cross-section which was announced in 1953. The height has been reduced by ⅝ of an inch and the weight by over one pound.

The preheat ballast and lamp combination has the obvious disadvantages of slow starting and higher maintenance costs because of the mechanical starter. To overcome these disadvantages, the slimline and instant start lamps were developed.

Slimline lamp starting

The slimline lamps do not require preheating of their cathodes but start instantly upon the application of sufficient starting voltage.

The 48T12 lead-lag instant start ballast is much larger than the preheat ballast because a higher starting voltage is required. A comparison is shown in Figure 1. The ratio of open circuit voltage to lamp voltage is high. Therefore the strobe correction is low, being only 30°.

Figure 1-B includes a circuit diagram of the lead-lag ballast. The primary utilizes an auto transformer to step the voltage up to 450 volts. The lead lamp is connected in series with a reactor and condenser and placed across the high voltage auto transformer. The lag circuit is similar but includes only a reactor in series with the lamp. Before the lamp starts, the full 450 volts is available to ionize the gas in the lamp. As soon as the lamps start, the series reactors limit the current to the specified value.

This circuit also illustrates the disconnecting lamp holder feature incorporated to meet Underwriters' requirements. The common side of the line is connected through both disconnecting lamp holders before it is connected to the ballast. Removal of either or both lamps, breaks the primary circuit thus completely de-energizing the ballast.

The size of this ballast indicates that its cost is also high. For this extra cost, you get instant starting, low maintenance, and some strobe correction. The lead-lag instant start ballast has proved to be a very dependable, long-lived work horse and is preferred by many to the smaller series instant start ballasts.

Series sequence starting

The series sequence ballast is also available for use with two slimline or instant start lamps. This ballast was developed to provide a smaller, less expensive unit than the lead-lag type.

The development of the present series sequence ballast was accomplishtd in two steps. The first step produced the shunt condenser type. The circuit is shown in Figure 2. The two lamps are placed in series. The condenser shorts one lamp while the other lamp starts. With the flow of current in the started lamp, the condenser charges up to sufficient voltage to start the second lamp. Note that only one secondary is required. Figure 3 shows the vector diagram. You can see that since the lamps

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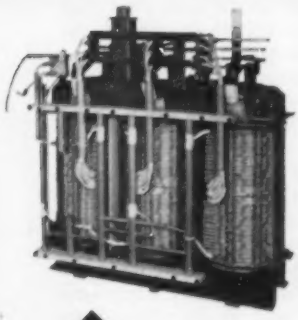

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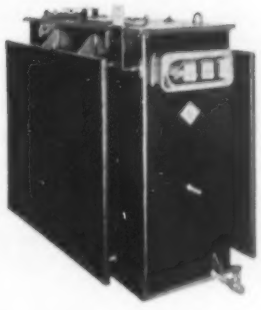

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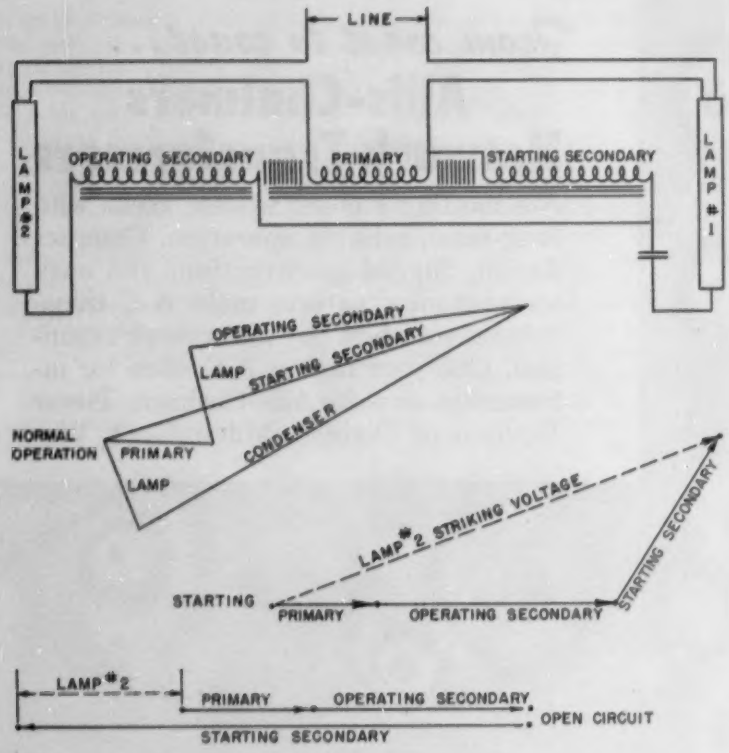

Figure 4—The circuit diagram and voltage relations of the auxiliary winding type series ballast are shown here. This ballast is smaller and less expensive than the older lead-lag ballasts but it does not provide stroboscopic correction. Servicing of lamps is complicated by fact that both lamps go out when one lamp burns out.

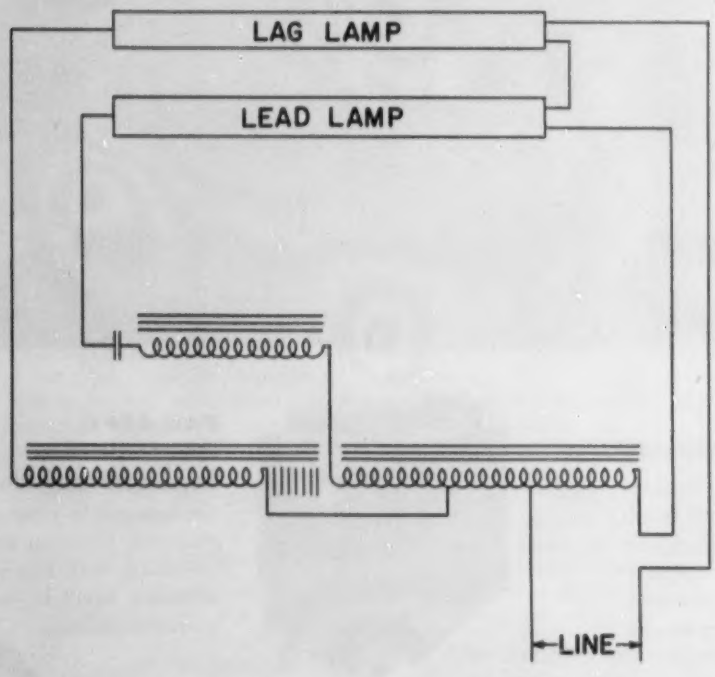

Figure 5—This is an improved lead-lag type of ballast. Improvements in design have brought its size near to that of the series type.

are in series and in phase, no strobe correction is obtained.

The shunt condenser type of series ballast provided low starting current, and extensive tests by lamp manufacturers showed that damage resulted to the lamp cathode. The ASA specifications were changed to provide for ballasts which would supply sufficient energy to get the lamp out of this low current operation as fast as possible.

Further development produced the series sequence ballast circuit which overcomes the disadvantage just mentioned. This ballast is appreciably larger as illustrated in Figure 3. The circuit and vector diagrams are shown in Figure 4. Note the similarity to the lead-lag ballasts. Three coils are again required. This ballast consists of a primary winding and loosely coupled operating and starting windings. The operating winding is effectively in series with the primary and the condenser and ultimately operates the two lamps in series.

When the primary is energized, the vector sum of the primary and the operating winding voltage is 180° out of phase with the starting winding voltage, and together they supply approximately 200 volts to Lamp No. 2, which is insufficient to fire that lamp. The starting winding supplies 525 volts directly to Lamp No. 1 in series with the condenser, which is sufficient to strike that lamp. After Lamp No. 1 is conducting, the phase angle of the starting winding voltage shifts sufficiently so that it vectorially adds to the sum of the primary and operating windings. This voltage appears across Lamp No. 2 and is high enough to fire the second lamp. After both lamps have started, the starting winding floats in the circuit as indicated in the normal operation vector diagram.

This ballast design resulted in an increase in ballast size and weight over the shunt condenser unit previously described. Perhaps future developments will find a more positive way of shorting one lamp, and a new smaller ballast will result.

The series ballast as compared to the old lead-lag ballast is smaller and less expensive. It does not provide stroboscopic correction. Some confusion exists in servicing since both lamps may go out when one lamp fails, and it is difficult to know which lamp to replace.

(Continued on page 101)

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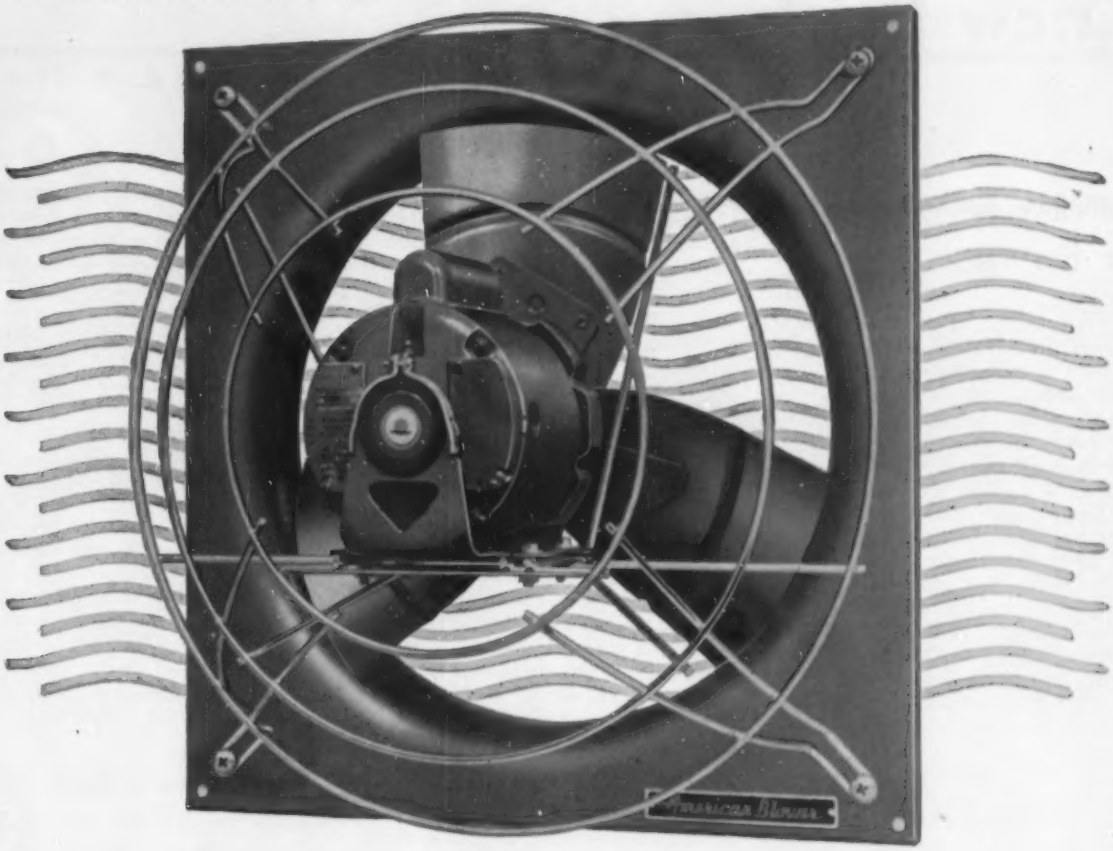

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Know the law

by Arthur L. H. Street

Damages claimed for fire cause

◆ PROVISIONS of the National Electrical Code have been adopted by the North Carolina Building Code, and affect a suit brought in that state by an industrial concern for loss of machinery, etc., by fire attributed to defective wiring and negligent installation of fixtures by electrical contractors. (Lutz Industries v. Dixie Home Stores et al., 88 S. E. 2d 333.)

The case had not been tried when the decision was rendered, being brought before the North Carolina Supreme Court for settlement of preliminary questions whether the plaintiff's allegations sufficiently stated a right to collect damages even if true. Here is the gist of the principal points decided by the court:

It was incumbent on plaintiff to prove that, if specific provisions of the electrical code were violated, the violation was the direct cause of the fire loss sustained by plaintiff.

By action of the North Carolina Legislature adopted provisions of the National Electric Code constitute law in that state. In this case such provisions governed to the extent that they had been approved by the Commissioner of Insurance and did not adopt any rule more rigid than authorized by the North Carolina Building Code.

No more than actual damages could be collected where mere negligence by defendants was alleged.

Liability to third parties

◆ READERS of these "Know the Law" articles in ELECTRICAL SOUTH may have noted that most of the court decisions mentioned were rendered by the appellate courts of the states in which the magazine principally circulates. But there are subjects on which all, or most all, courts agree, and as to them we deem it helpful to our readers to include reference to decisions which might be regarded by the courts of the South, Southeast and Southwest as being worth following. This article deals with such a subject.

Almost any court would be apt to agree with what the Connecticut Supreme Court of Errors lately decided in the case of Del Gaudio v. Ingerson, 115 Atl. 2d 665, concerning the liability of an electrical contractor to third persons. The substance of that decision is that where such a contractor has completed his work and it has been accepted by the owner or prime contractor for which it was done, the electrical contractor will not be liable for subsequent injury to some third person even if the injury resulted from negligent installation, *unless the work was turned over in such defective and imminently dangerous condition that the electrical contractor knew, or ought to have known, that somebody might be injured.*

Owner had accepted job

The Connecticut court referred to its earlier decision in the case of Bogoratt v. Pratt & W. Aircraft Co., 114 Conn. 126, 157 Atl. 860. In that case, an electrical subcontractor had installed electric wiring. A month later an employee of another contractor working on the same building was injured through coming in contact with the wiring. There was considerable doubt as to whether the accident could be said to be due to defective wiring chargeable to the electrical subcontractor. But the court said that if it could be, the case would nevertheless come within the well established rule of law "that where the work of an independent contractor is completed, turned over to and accepted by the owner, the contractor is not liable to third persons for damages or injuries suffered by reason of the condition of the work, even though he was negligent in carrying out the contract."

In a Pennsylvania case liability of a company, which had installed an electric switch on premises, for injury to an employee of the owner turned upon the question of fact whether the installation job had been accepted by the owner before the accident. (Kingan v. Duquesne Light Co., 287 Pa. 280, 135 Atl. 253, decided by the Pennsylvania Supreme Court.)

A federal court decision (Ford v. Sturgis, 56 App. Dist. Col. 361, 14 Fed. 2d 256) is to the effect that, except where work is left in concealed and inherently dangerous condition, the contractor should not be liable because otherwise, first, "there would be no end to suits," and, second, the true cause of injury is fault of the owner in *maintaining* a dangerous condition and not of the contractor in *creating* it.

Substitution of liability

A Louisiana Court of Appeals has approved the following statement of law: When the work is finished by the contractor and accepted by the employer, the latter is substituted as the responsible party for existing defects, and the same rule is applied to subcontractors so as to relieve them from liability to the original employer where the work has been finished and accepted by the original contractor. The reason for the substitution of liability is found in the general reasoning that a suit for damages for negligence should not be started unless the contractor was under some duty to the injured party at the time and place where the injury occurred. (Schott v. Ingargolia, 180 So. 462.)

The North Carolina Supreme Court has recognized that in such cases the liability of a contractor or subcontractor depends upon whether he left his furnished work in a condition so negligently defective as to be imminently dangerous to third persons. (Williams v. Charles Stores Co., 209 N. C. 591, 184 S. E. 496.) To the same effect is a decision by the Mississippi Supreme Court (Holmes v. T. M.

(Continued on page 101)

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Case histories in labor relations

How would you have handled these labor grievances?

This roundup of day-to-day problems in labor relations provides an opportunity to test your judgment as to what is right and wrong. Each incident is an actual grievance that went to arbitration. Names have been changed for obvious reasons, but readers may obtain actual citations on any specific case by writing to the editor.

Seniority problem

Does an employee promoted to foreman accumulate seniority?

What happened

Glenn Van Nortwich was a good maintenance man, and after ten years was promoted to the job of working foreman. But a year later business took a turn for the worse and the company was forced to lay off 50 employees. In the reshuffle of jobs, Glenn was demoted back to his former job. This meant that Hal Martin, a seven year man, had to make way for Glenn on the grounds that the ex-foreman had greater seniority. Martin filed a grievance protesting his layoff. He put it this way:

1. When Glenn was promoted to foreman he lost the seniority he had accumulated during his ten years as a worker.

2. Seniority protection is for workers and not for management. Glenn, being a foreman, was a management man. When he was promoted, he "quit" being an employee, so he can't claim seniority.

The company didn't see it that way at all. In fact, it was quite indignant and told the arbitrator that if Martin's position were supported, no employee would accept a promotion to a supervisory job for fear of losing the protection of seniority in case of a downgrading.

Was the company: Right ☐ Wrong ☐

What arbitrator ruled: "From any logical viewpoint it would seem that an employee who quits would most naturally be expected to forfeit his seniority. But a promotion to a management job cannot be considered a 'quit' by any standard of reasoning. It is traditional with American workers to work and look forward to the day when they may gain promotion to a better job. And should such an opportunity arise, it is understandable that employees would wish to be in a position to accept a promotion to foreman without risking a forfeiture of their long seniority.

"I conclude therefore that a worker who is promoted to foreman does not lose his seniority. However, I am of the opinion that an employee who is promoted to foreman does not accumulate seniority while he is in a supervisory position. Glenn Van Nortwich is entitled to ten years seniority accumulation. The year he served as a supervisor does not count, and I so rule."

Promotion policy

Can you deny promotion to a slow worker even though he may have the necessary seniority?

What happened

When Velon Hacker had a spat with his foreman and quit his job, Robert Longley put in for a promotion. He'd been with the company for 24 months and was next in line. But when the job was filled the following week, Longley was bypassed. He immediately griped to his foreman. The supervisor was not surprised and was ready with an answer. He told Longley that in the 24 months that he had worked in the department:

(1) He had received one warning for wasting time.

(2) He talked too much on the job.

(3) Most of all, he took too long to complete an assignment.

(4) He therefore was not entitled to a promotion even though he did have seniority.

Longley was unimpressed with the answer he got and took his case to the higher-ups. They supported the supervisor even though there was a specific policy which read: "If a vacancy occurs in any classification, the employee with the highest seniority in the next lower classification shall have first preference to fill such a vacancy. The superintendent shall consult with the chief steward in cases where upgrading is under consideration."

When the case came to arbitration the employee argued that under this kind of policy, the company had no other choice but to promote a worker on the basis of length of service.

That's where you're wrong answered the management. If seniority were the only consideration for promotion, then why do we have a section which says that the superintendent should talk to the shop steward? Obviously the reason for that is to give the company some discretion in picking people for upgrading.

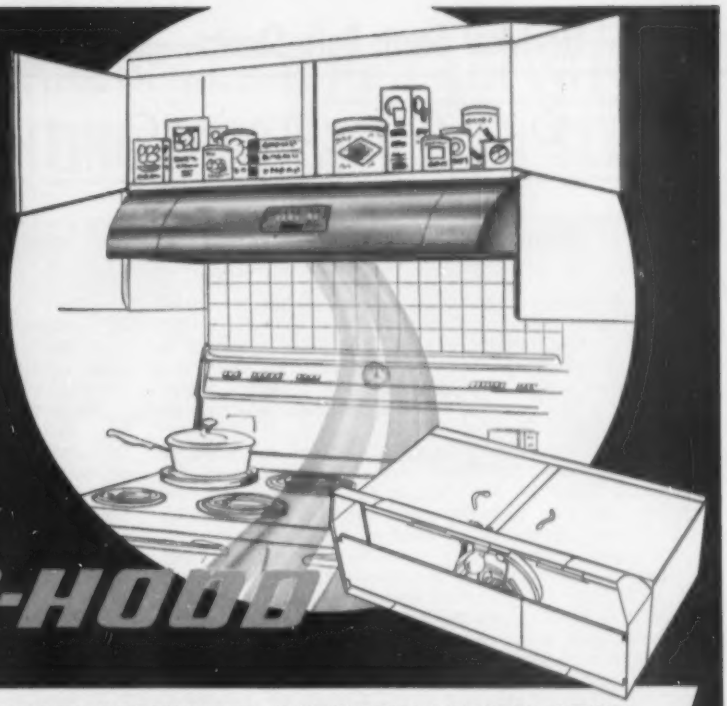
Was the company: Right ☐ Wrong ☐

What arbitrator ruled: "While it may be conceded that every employee is more than likely to have different abilities, in considering whether an employee should be bypassed, it should be of *substantial* character, and refusal to upgrade should be based *not upon light and insignificant reasons*. Although the company contends that Longley had a poor work record, there is insufficient evidence to establish that Longley's past performance was of *so poor quality and so slow* as to provide a valid reason for bypassing. Otherwise, why was he kept in his job for 24 months?

"Moreover, according to company policy the employee with seniority is entitled to first preference. It is the considered judgment of the arbitrator that a reasonable construction of the language of the policy requires that

(Continued on page 102)

It Pays... 4 Ways to feature the FASCO POWER-HOOD



THE ONLY COMPLETE KITCHEN VENTILATOR THAT'S ALL-IN-ONE-HOOD

Hood Adjusts to Fit Any Space 30" to 42"

1 More Efficient... Service-Free-Operation

Unique, self-contained snap-in ventilator incorporates Fasco's exclusive high efficiency turbo radial impeller wheel . . . *Delivers greater air volume* with *less noise* than conventional blower-wheel . . . 3 speeds. Ultra high capable of summer cooling.

2 Slashes Installation Costs—

Power-Hood comes pre-wired . . . Installs with just one duct opening and 6 sheet metal screws . . . absolutely no *cabinet cutting* . . . Ingenious design enables shifting of ventilator to avoid studs . . . allows perfect fit to non-plumb installations where walls or cabinets are not square.

3 Saves 66⅔% on Inventory, Storage, Investment Costs—

One Power-Hood adjusts to fit every requirement from 30" to 42" . . . cuts your inventory ⅔ . . . reduces warehouse space 70% over fixed-length hoods.

4 Easy-To-Sell Consumer Features

The only ventilator that takes absolutely no valuable cabinet space. Push-button operation of 3 speeds and underhood light. Modern curved contour hood design. Removable grease tray.

IT PAYS ALWAYS to FEATURE the Complete FASCO Line

- Outside Wall Ventilating Fans
- Ceil-N-Wall Fans
- Adjust-O-Hoods (One hood adjusts from 30" to 42")

AND POWER-HOOD IS PRE-SOLD TO CONSUMERS AND BUILDERS WITH FASCO ADS IN:

- HOME MODERNIZING
- AMERICAN BUILDER
- HOUSE & HOME
- PRACTICAL BUILDER
- NAHB CORRELATOR
- HOUSE BEAUTIFUL BLDG. MANUAL

WRITE FOR COMPLETE CATALOG

FASCO Industries, Inc. 87 AUGUSTA ST. ROCHESTER 2, N. Y., U. S. A.

New, revised estimating tables continued in this issue

A NEW SERIES of estimating tables, completely revised in the light of more recent jobs and experience, are presented in this issue and will appear from month to month in forthcoming issues. These electrical estimating data sheets cover labor only and are arranged alphabetically with the basic material headings as a title for each tabulation.

Labor units given in these tabulations are based on a minimum of interference during work progress. The averages listed do not provide for abnormal job conditions, and any such abnormal conditions will require adjustments by the user, based on his experience.

The work units covered by each table are composed of one or more separate but closely related operations necessary for the complete installation of a particular basic item of electrical equipment. These operations associated with the basic material are described at the bottom of each table.

Most of the electrical estimating tabulations follow the same form. Column 1 at the left shows the size of the material to be installed. The second column from the left gives the time required to install the material, and it should be noted especially that this "productivity" column may be based on individual units or in the case of cable or conduit on units of 100 feet or 1,000 feet. The abbreviations "Ea." for each, "C" for hundreds, and "M" for thousands in Column 2 indicate the basis of the labor hours.

Columns 3 to 13, from the left, give the actual labor costs in dollars per unit of installation, at various hourly wage rates.

When calculations are being made for an hourly wage rate that doesn't correspond to any of the rates listed in Columns 3 to 13, the user may multiply the number of hours in Column 2 by 100 and this will give the labor cost based on an hourly wage rate of $1 per hour. By multiplying this by the hourly wage rate that actually applies in the user's locality, the exact labor cost of the operation may be obtained. Labor costs obtained in this way will be for units, hundreds of feet, etc., as given in heading of Column 2 of the table.

The labor units covered by the tables represent direct job labor costs and do not include delivery of material to site, engineering, estimating, or any other indirect cost.

As will be noted, some of the electrical estimating tabulations to be given will be for independent operations, such as excavating, backfilling, etc. These are included for use in preparing estimates on work of a special nature not covered under a specific table heading.

Tables will appear in alphabetical order.

NATIONAL ELECTRIC "OVAL FLEX"
ARMORED BUSHED CABLE
WOOD MOUNTED "EXPOSED"

SIZE	HOURS PER "C"	LABOR COST PER FT. INSTALLED AT FOLLOWING RATES $1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
14 - 2	5.2	.065	.078	.091	.104	.117	.13	.143	.156	.169	.182	.195
12 - 2	5.2	.065	.078	.091	.104	.117	.13	.143	.156	.169	.182	.195
10 - 2	5.4	.068	.081	.095	.108	.122	.135	.149	.162	.176	.189	.203
14 - 3	5.4	.068	.081	.095	.108	.122	.135	.149	.162	.176	.189	.203
12 - 3	5.8	.073	.087	.102	.116	.131	.145	.16	.174	.189	.203	.218
		MASONRY MOUNTED "EXPOSED"										
14 - 2	6.4	.08	.096	.112	.128	.144	.16	.176	.192	.208	.224	.24
12 - 2	6.4	.08	.096	.112	.128	.144	.16	.176	.192	.208	.224	.24
10 - 2	6.6	.083	.099	.116	.132	.149	.165	.182	.198	.215	.231	.248
14 - 3	6.6	.083	.099	.116	.132	.149	.165	.182	.198	.215	.231	.248
12 - 3	6.6	.083	.099	.116	.132	.149	.165	.182	.198	.215	.231	.248
		MASONRY MOUNTED "TO BE PLASTERED IN"										
14 - 2	6.1	.076	.092	.107	.122	.138	.154	.169	.183	.198	.214	.229
14 - 3	6.1	.076	.092	.107	.122	.138	.154	.169	.183	.198	.214	.229
10 - 2	6.3	.079	.095	.11	.126	.142	.158	.173	.189	.205	.221	.236
14 - 3	6.3	.079	.095	.11	.126	.142	.158	.173	.189	.205	.221	.236
12 - 3	6.3	.079	.095	.11	.126	.142	.158	.173	.189	.205	.221	.236

E-103-B

LABOR: INCLUDES CUTTING, SETTING ANCHORS, INSTALLING DUCT AND CONNECTING TO TERMINUS.

7-56

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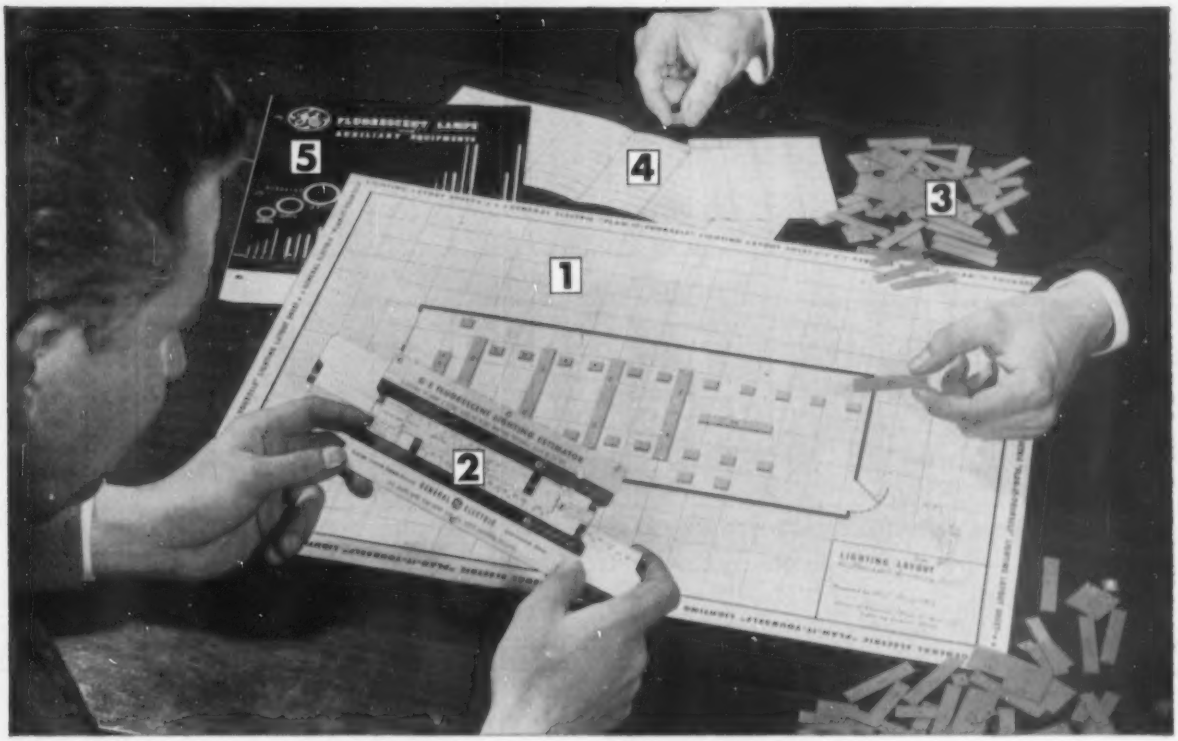
GENERAL ELECTRIC ANNOUNCES A NEW LAYOUT KIT TO MAKE YOUR LIGHTING JOBS EASIER TO SELL!



Your General Electric "Plan-It-Yourself" Lighting Layout Kit contains (1) layout sheets, (2) a fluorescent lighting estimator, (3) movable, scaled "fixtures", (4) gummed "fixtures" for your permanent layout, and (5) a lighting design guide.

Send for your new G-E "Plan-It-Yourself" Lighting Layout Kit today. It will help your lighting prospects sell themselves.

The G-E "Plan-It-Yourself" Lighting Layout Kit is a brand new idea that makes your selling more profitable because:

1. It makes your selling easier. Your prospect helps sell himself because he is in on the planning. He can visualize his lighting needs more easily.

2. You can "sell up". Because your prospect sees *why* the new layout fits his needs, you can sell him a better lighting job. *You make more profit!*

3. You'll "close" more sales. Once the layout is complete, your prospect okays it. Your sale is half closed even before a complete cost estimate is made.

4. Order your sales-building "Plan-It-Yourself" Lighting Layout Kit Today! Use it to make your next lighting job more profitable—more fun! Costs only $1.75—contains enough material for a dozen lighting jobs. **Mail the coupon below,** or see your G-E lamp supplier.

TO: General Electric, Large Lamp Dept., ES-7,
Nela Park, Cleveland 12, Ohio.

Gentlemen:

Please send me _____ new G-E "Plan-It-Yourself" Lighting Layout Kits @ $1.75 per kit. I enclose $_____.

SEND TO:_____
(Please Print)

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

Progress Is Our Most Important Product

GENERAL ELECTRIC

NATIONAL ELECTRIC PRODUCTS
OVALFLEX "FITTINGS" WOOD MTD.

ITEM NO.	HOURS EACH	$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
412	.2	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75
413	.2	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75
24CQ	.25	.31	.38	.44	.50	.56	.63	.69	.75	.81	.88	.94
26CQ	.25	.31	.38	.44	.50	.56	.63	.69	.75	.81	.88	.94
2862	.3	.38	.45	.53	.60	.68	.75	.83	.90	.98	1.05	1.13
2662	.4	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40	1.50
2663	.4	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40	1.50
417051	.35	.44	.53	.61	.70	.79	.88	.96	1.05	1.14	1.23	1.31
417251	.35	.44	.53	.61	.70	.79	.88	.96	1.05	1.14	1.23	1.31
		MASONRY MOUNTED										
412	.25	.31	.38	.44	.50	.56	.63	.69	.75	.81	.88	.94
413	.25	.31	.38	.44	.50	.56	.63	.69	.75	.81	.88	.94
24CQ	.35	.44	.53	.61	.70	.79	.88	.96	1.05	1.14	1.23	1.31
26CQ	.35	.44	.53	.61	.70	.79	.88	.96	1.05	1.14	1.23	1.31
2862	.4	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40	1.50
2662	.45	.56	.68	.79	.90	1.01	1.13	1.24	1.35	1.46	1.58	1.69
2663	.45	.56	.68	.79	.90	1.01	1.13	1.24	1.35	1.46	1.58	1.69
417051	.4	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40	1.50
417251	.4	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40	1.50

E-102-B

NOTE: 412-413 INCLUDES 1 ANCHOR AND MAKE UP; EXT. BOX COVERS INCLUDES ADDITIONAL RIMS MAKE UP OF BOX. BOXES INCLUDE MOUNTING AND MAKE UP OF TAPS, ETC. DRILLING IN MASONRY IN MASONRY BY ELECTRIC DRILL OR HAMMER.

7-56

ARMORED "BXL" CABLE
SURFACE INSTALLATION

NEW WORK

NO. CONDR'S SIZE	HRS. "C"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES $1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
2/14	5.0	.063	.075	.088	.100	.113	.125	.138	.150	.163	.175	.188
2/12	5.2	.065	.078	.091	.104	.117	.130	.143	.156	.169	.182	.195
2/10	5.3	.066	.08	.093	.106	.119	.133	.146	.159	.172	.186	.199
2/8	6.7	.084	.101	.117	.134	.151	.168	.184	.201	.218	.235	.251
2/6	7.5	.094	.113	.131	.15	.169	.188	.206	.225	.244	.263	.281
3/14	5.2	.065	.078	.091	.104	.117	.13	.143	.156	.169	.182	.195
3/12	5.5	.069	.083	.096	.11	.124	.138	.151	.165	.179	.193	.206
3/10	6.3	.079	.095	.110	.126	.142	.158	.173	.189	.205	.221	.236
3/8	8.0	.10	.12	.14	.16	.18	.20	.22	.24	.26	.28	.30
3/6	8.9	.111	.134	.156	.178	.20	.223	.245	.267	.289	.312	.334
3/4	10.6	.133	.159	.186	.212	.239	.265	.292	.318	.345	.371	.398
		EMBEDDED IN CONCRETE										
2/14	2.7	.034	.041	.047	.054	.061	.068	.074	.081	.088	.095	.101
2/12	2.8	.035	.042	.049	.056	.063	.070	.077	.084	.091	.098	.105
2/10	2.9	.036	.044	.051	.058	.065	.073	.08	.087	.094	.102	.109
2/8	3.6	.045	.054	.063	.072	.081	.09	.099	.108	.117	.126	.135
2/6	4.0	.05	.06	.07	.08	.09	.10	.11	.12	.13	.14	.15
3/14	2.9	.036	.044	.051	.058	.065	.073	.080	.087	.094	.102	.109
3/12	3.0	.038	.045	.053	.06	.068	.075	.083	.09	.098	.105	.113
3/10	3.3	.041	.050	.058	.066	.074	.083	.091	.099	.107	.116	.124
3/8	4.3	.054	.065	.075	.086	.097	.108	.118	.129	.140	.151	.161
3/6	4.7	.059	.071	.082	.094	.106	.118	.129	.141	.153	.165	.176
3/4	5.8	.073	.087	.102	.116	.131	.145	.160	.174	.189	.203	.218

E-102-B

LABOR: INCLUDES PREPARATION, INSTALLING ANCHORS (WITH POWER), INSTALLING CABLE AND INSTALLING STRAPS. (NO CHANNELLING OR DRILLING PASSAGE HOLES THROUGH WALLS).

7-56

Electrical Estimating—III

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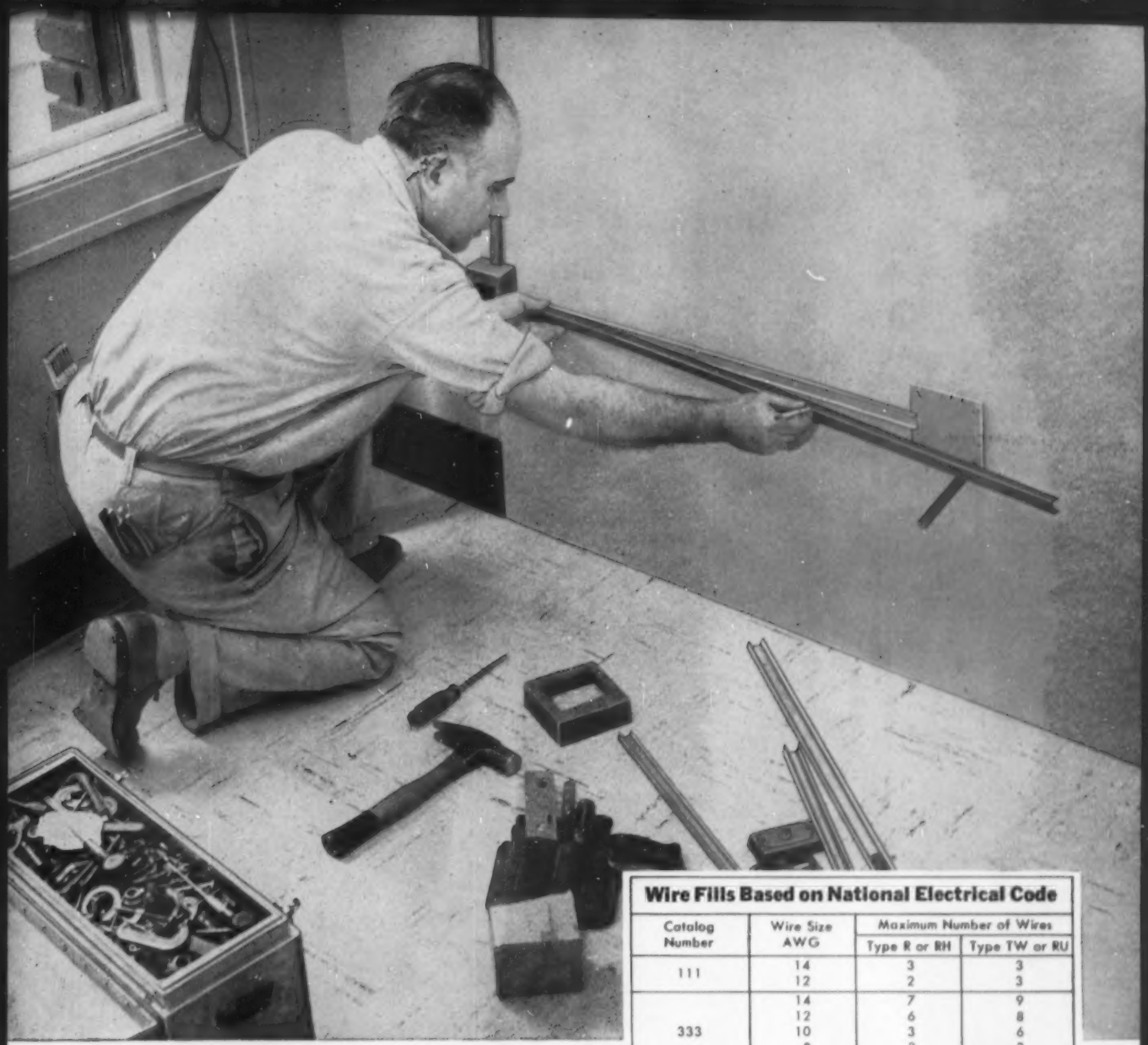


"ON THE SURFACE" WIRING SAFE AND FAST...

with National Electric Metal Molding

National Electric Metal Molding is one of six steel surface electrical raceways made by National Electric. It's for quick, safe, electrical installations in homes and buildings of all types. Easy to install. Just fasten the base into position, lay in the wires, and snap on the capping. Catalog available with full information.

Listed by Underwriters' Laboratories, Inc.

National Electric Products

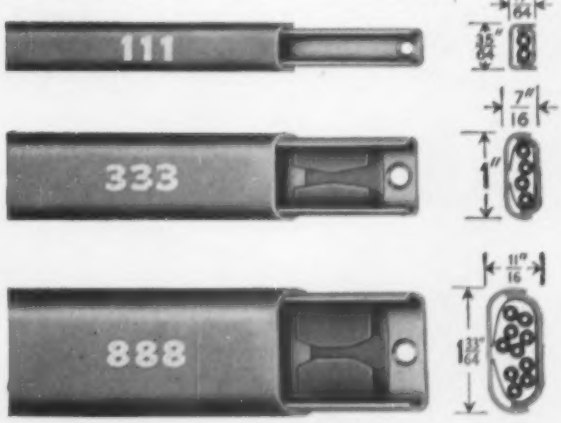
PITTSBURGH, PA.

3 Plants • 10 Warehouses • 36 Sales Offices

Wire Fills Based on National Electrical Code

Catalog Number	Wire Size AWG	Maximum Number of Wires	
		Type R or RH	Type TW or RU
111	14	3	3
	12	2	3
333	14	7	9
	12	6	8
	10	3	6
	8	2	3
	6		2
888	14	10	10
	12	10	10
	10	9	10
	8	7	10
	6	4	5

National Electrical Code limits wire fill to ten conductors



Pan Dee Restaurant, Chicago, Ill. Note how this 5-unit Wondabar using standard Virden fixtures complements the modern decor of this restaurant. Here is dramatic emphasis and soft, easy lighting at a fraction of the cost of custom-made fixtures.

now! decorative lighting using stock lighting fixtures

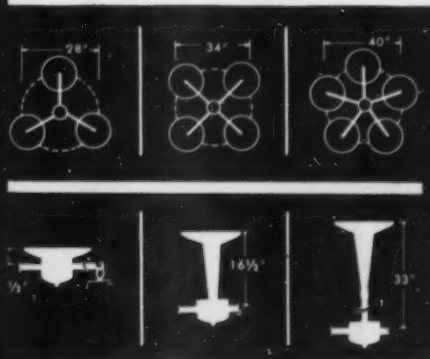
Here's the practical answer to your commercial lighting problem. It's the new Wondabar by Virden. Now you can have smart, dramatic lighting at a most economical cost. For the Wondabar uses *standard* lighting fixtures. It opens up an entirely new range of effects, makes possible decorative lighting formerly possible only with expensive, custom-designed fixtures.

You can choose, from Virden's wide selection, the fixture design that best fits your decor. You can use modern, contemporary, or period—gain almost any decorative and functional effect that you desire.

Installation is economical, too! In most cases, the Wondabar can be installed quickly and easily to the present fixture outlet—without rewiring or expensive and time-consuming remodeling.

Your nearby Virden distributor has full details. Ask him about the Wondabar. He'll be glad to show you how versatile it is, how it can give you the dramatic, effective lighting you want, at a most economical cost. Or write John C. Virden Co., Dept. ES-7, 6103 Longfellow Avenue, Cleveland 3, Ohio.

decorative lighting by virden



Wondabar kits are available in 3, 4 or 5 arm spreads, for use with any standard loop-equipped fixture. Almost any length ceiling drop is available. Finish is dove grey.

The Wallace Company, Poughkeepsie, N. Y. Warm, even lighting from smart, modern fixtures gives this furniture department an entirely new look—at a cost far below custom-made fixtures.

H. Weber Sons & Co., Zanesville, Ohio. Light to enhance fabrics; fixtures to create the buying mood; that's the twin advantage the Wondabar brought this store.

BE SURE OF QUALITY CONTROL!

There's only one way to be sure that you have a quality water heater—you have to be sure that EVERY part in it is a quality part!

Practically every part of a JACKSON Water Heater is produced in JACKSON'S own plant! ALL parts must pass JACKSON'S rigid specifications and tests! *That's* quality control! That's why you can be sure of satisfaction when you stock JACKSON Water Heaters!

Write, wire or phone today for information on the COMPLETE Jackson line of Gas and Electric Water Heaters! There is no obligation.

JACKSON

W. L. JACKSON MANUFACTURING COMPANY

1222 EAST 40TH STREET CHATTANOOGA 7, TENN.

One in a series to emphasize the economy of Electrical Wholesale Distribution

He says he performs a vital economic function which some people strangely think can be ignored... Hmmm....
He reduces hidden costs for electrical users, and gives advice and technical help—but isn't a philanthropist or magician. Hmmm....
He cuts electrical manufacturers' costs of distribution—with resulting lower prices to the user—but he isn't an industrial engineer. Hmmm....
He substitutes for hundreds of manufacturers' salesmen—but he isn't Superman. I give up!
GUESS MY LINE
Shucks, any smart electrical user would know he's a Distributor!

"Electrical Wholesaler Distribution reduces the Manufacturer's selling cost and thereby reduces the selling price of electrical supply material to the user. Therefore, our policy has been to distribute Thomas & Betts products exclusively through the Electrical Wholesaler."*

LOOK FOR THIS SIGN — AUTHORIZED DISTRIBUTION T&B ENGINEERED — IT'S THE MARK OF AN AUTHORIZED T&B DISTRIBUTOR

THE THOMAS & BETTS CO.
INCORPORATED
72 BUTLER STREET, ELIZABETH 1, NEW JERSEY
THOMAS & BETTS, LTD., MONTREAL, P. Q., CANADA
MANUFACTURERS OF FINE ELECTRICAL FITTINGS SINCE 1898

*Quoted from the T & B Plan of Wholesaler Distribution. If you would like to know the complete story of the T & B Plan, write:

THIS CATALOG CONTAINS

THE POWER CONNECTORS AND BUS SUPPORTS NEEDED FROM GENERATION TO DISTRIBUTION

S. D. SAUTEL, Assistant to Sales Manager, is seen here with the newest Southern States catalog. The small type ground connector in his hand, and the 4,000 ampere expansion stud connector to his left graphically illustrate the wide range of fittings manufactured by Southern States Equipment Corp.

Three years ago Southern States began an extensive program of re-designing and expanding its line of power connectors and bus support clamps. Ears were strengthened and weights increased 40% to 50%.

The result is a line of rugged fittings in a full range of sizes and types. You can choose a suitable Southern States connector for application on your system for practically any requirement . . . from the generating station to the distribution system.

The complete line is included in the new Southern States catalog, which is fully illustrated and indexed to make it easy to find the exact fitting required for any application.

If you have not yet received your copy and could use one, see your Southern States representative or write direct for Catalog No. 526.

SS®

SOUTHERN STATES EQUIPMENT CORP.

HAMPTON, GEORGIA

IN CANADA: Dominion Cutout Co., Ltd., Toronto

Utility Engineers' Forum

Design
Installation
Testing
Maintenance

Building blocks for automation

◆ A NEW METHOD by which industry can select from a group of 21 standard "building block" components the best electronic control system to regulate "push-button" operations from remote points has been announced by a manufacturer of electronic control equipment.

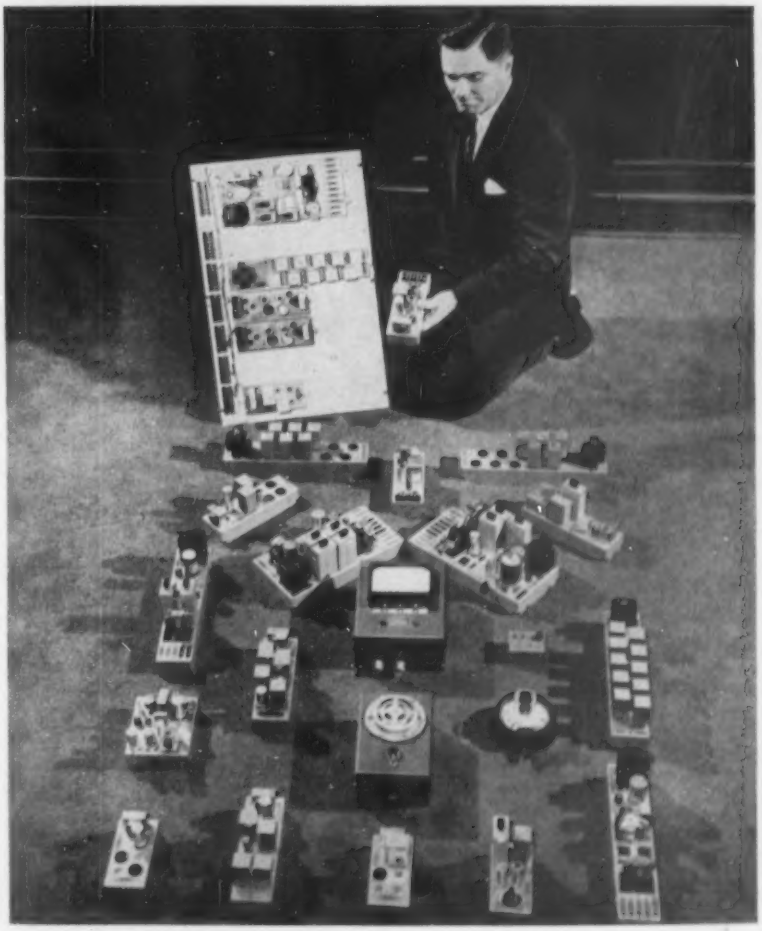
Although this novel method, developed after four years of research, is already in use in the oil industry, in petrochemical plants, and in municipal water pumping systems, providing a "brain" and a "nervous system" to control vital production operations, it appears that the idea has application possibilities in the electric utility industry for remote control of important operations.

The modular units are inexpensively mass-produced, are hooked up merely by plug-in units which can be expanded or regrouped by semi-specialist personnel, and utilize a single standard communications channel which can handle hundreds of control and supervisory functions even at distances up to hundreds of miles, at major economies.

Many conventional control systems for in-plant or outdoor monitoring functions require a large number of communications channels to accommodate varied or multiple functions. Also, most present systems require substantial amounts of companies' engineering staff time to install and maintain custom fabricated units.

John J. Smith, Sparks-Withing-

(Continued on page 99)



These 21 "building block" components can be utilized in various combinations to make-up remote control and regulating equipment for industry and utilities. John J. Smith, president of Sparks-Withington Co., manufacturer of the devices, shows how the various units can be assembled into an electronic control unit for remote operations, metering, etc.

Power transformer fuse protection

By Ray A. Larner, Meter and Relay Engineer, Texas Electric Service Co., Fort Worth, Texas

◆ POWER FUSES are being used in increasing numbers for the safe protection of power transformers. Among the many necessary considerations is an understanding of fuse types and characteristics, along with transformer short circuit currents and their effect on transformers. Of major interest in this problem are the possibilities of coordination with other significant protective devices in the entire chain of protection.

On a large system, transformer protection by fuses is a continuing problem. New transformers are continually being installed. Older transformers are being moved into either new or old locations. Most of these need an answer to the following question. What size and type fuse is required to protect the transformer and grade with other protective equipment?

For small size transformers it might conceivably be practical to make a table of transformer sizes and corresponding fuse sizes for certain voltage classes. Such suggested fusing tables have been made by the manufacturer of fuses, also in some cases by the user. A much safer approach, however, is to study each case in order to determine protection and coordination requirements.

Of primary importance in this study is a knowledge of fault currents including current flow in all of the transformer windings for three phase, phase to phase, two phases to ground and single phase to ground faults. Where an extensive distribution system is to have proper fuse and relay coordination, it is necessary to know the fault currents at any point.

Distribution load transformer

A good method of arriving at an over-all solution to good protection including the correct size of fuse for a transformer has been the use of a coordination study sheet. A typical study sheet is shown as Figure 2 on which the system may be reduced to a common 7200/12470 volt basis. With time

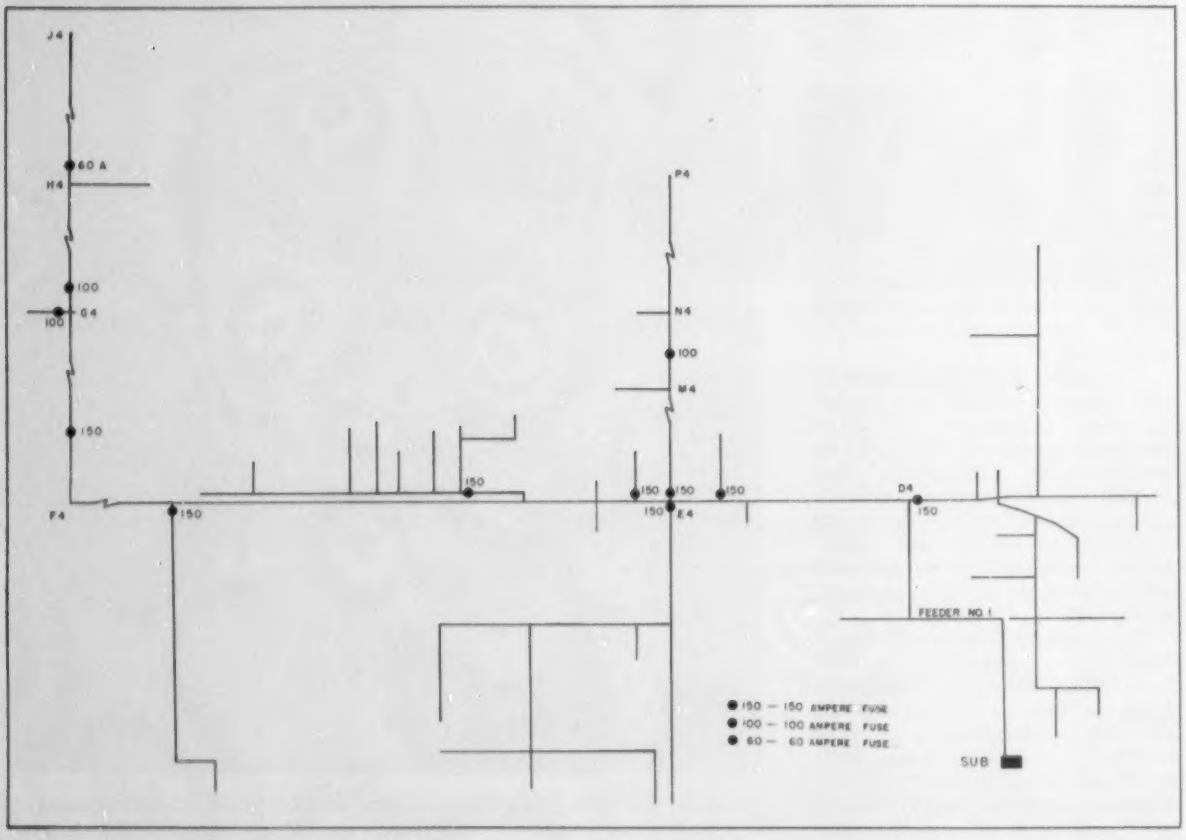


Figure 1. Typical distribution feeder showing location of sectionalizing fuses. This feeder is the basis for the fuse coordination study sheet, Figure 2, for transformer supplying distribution.

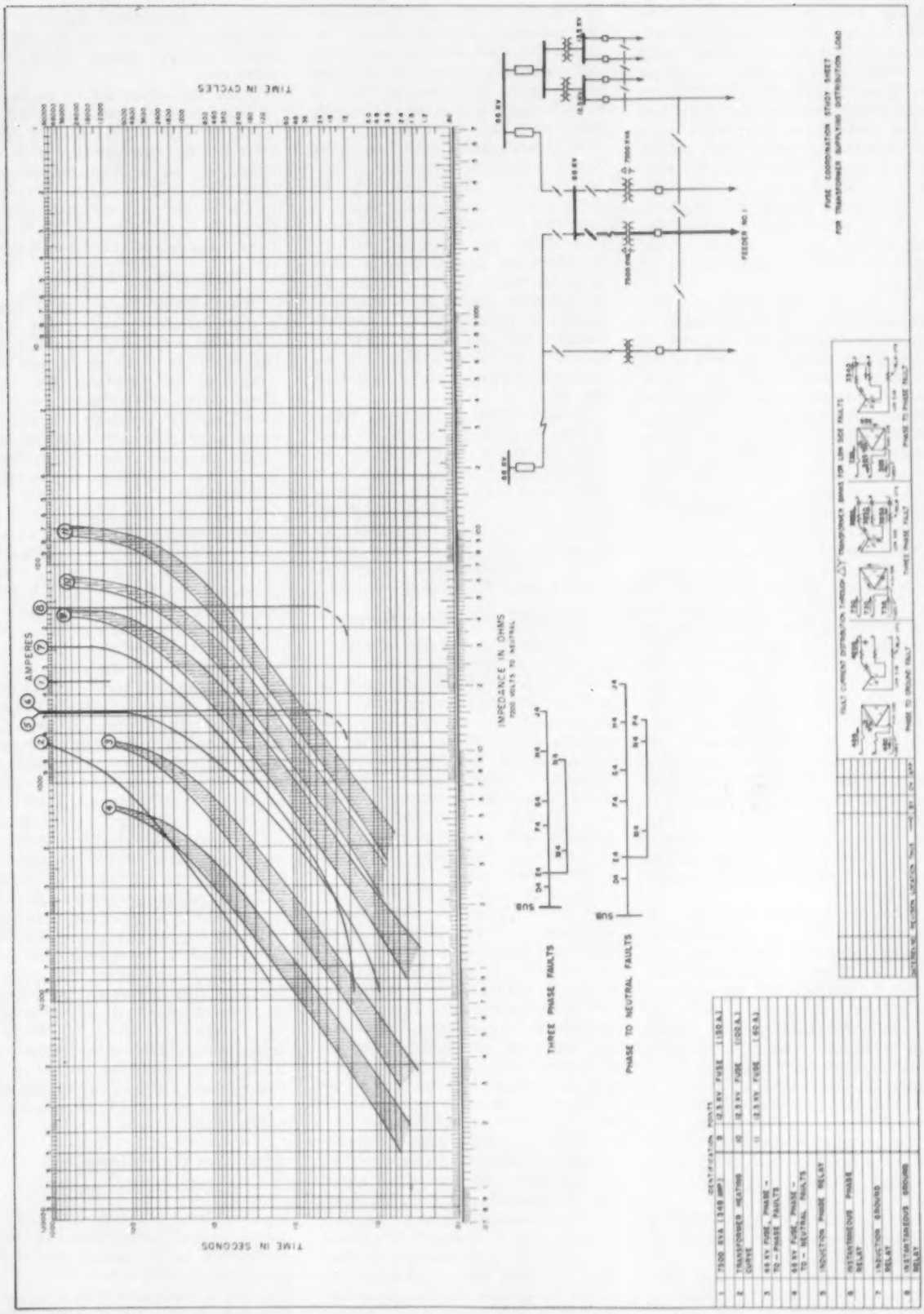


Figure 2. Fuse coordination study sheet for transformer supplying distribution load. Tabulation at lower left of drawing identifies the lines and curves plotted on the time-current chart.

as the ordinate scale from .01 to 1000 seconds (.6 to 60,000 cycles), ohms as the abscissa from 0.072 to 7200, it is possible to put on one sheet practically all of the required information for fuse and relay protection of the transformer bank and the entire distribution system served from this source. It will be noted that amperes are read directly across the top from right to left. Figure 1 shows the distribution feeder which is the basis for the study sheet shown in Figure 2.

Beginning with known or calculated values of impedances, a complete impedance diagram is plotted for three phase and phase to ground faults in the clear space below the ohm scale. The transformer heating curve is ordinarily plotted next. From this stage of the study on, it is a matter of fitting in curves of the correct size fuses and relay settings to isolate only the minimum section of the system to clear the fault.

On Figure 2 is first drawn a one line diagram of a typical transmission line section between two large switching stations. This line has relatively few tripouts and is not critical to system stability. All faults are cleared in less than 20 cycles and the line reclosed automatically in 60 cycles. On this particular one line diagram is indicated the switching facilities in order to make this solution more clear. To the left of this diagram is drawn to scale all impedance values involved, including all of the particular distribution branch feeders (see Figure 1) down to the very end including the sectionalizing fuses.

When the impedance values are completed, and the transformer heating curve is drawn in, the next job is to draw in a suitable fuse curve to protect the transformer for phase and ground faults. In this case, a double vented expulsion drop-out fuse was selected which apparently provided good protection and yet grades well with the extremely inverse phase and ground relays used on Feeder No. 1. Next is plotted the three different fuses used on this feeder with adequate time separation for faults.

Relay protection and reclosing features have been worked out to provide good service to the most customers at reasonable cost. The inrush or "cold load" problem is solved very well by use of extremely inverse relays on the feeder breaker. The scheme is designed to clear all faults, both permanent and transient, instantaneously followed by fast breaker reclosing and automatic transfer to time delay tripping in order to blow a branch fuse if and when the branch line has a persistent fault.

A tripping delay of 1 to 2 cycles in the instantaneous relay trip circuit permits many faults to be self-clearing. A separate relay is provided to begin this timing action when the instantaneous relay picks up. Also a delay of some 50 to 60 cycles in reclosing is used to minimize faults from multiple lightning strokes and to permit voltage and the arc to blow out where motor load, on certain industrial circuits, might maintain the arc.

A fast resetting reclosing relay is used in order to reestablish normal reclosing performance and prevent unnecessary lock out. This reset time is usually set at 10 seconds. Another reclosing relay has been provided to reclose the breaker again after two minutes if the feeder has been locked out by two trips during the first 10 seconds.

Industrial load transformer

The one line diagram of Figure 3 shows a 2500-kva, 66,000-480 volt, delta-wye bank connected to a 66-kv transmission line through fuses and an air switch. Protection on the low side is also provided by fuses. As indicated in the diagram, supervisory-controlled motor-operated air switches are provided for sectionalizing the line on each side of the station. Line relay protection is distance carrier.

In order to locate the 66-kv bus as a starting point on an impedance diagram it is necessary to know the three phase short circuit value at the point or system impedance value to this point. In this case, the impedance diagram merely includes the transformer bank and has not been extended on into the customer's plant. This, however, can be done and probably will be done when more is known about the customer's switchgear.

In this particular case, the transformer manufacturer has furnished a short time loading curve based on the formula $I^2T = 1200$. Since the transformer is connected delta-wye, the fuse curve is plotted twice in order to indicate protection afforded the transformer for phase to ground faults. Since the customer has selected switchgear having a 3000 ampere fuse, this fuse curve was drawn in order to check the possibility of proper coordination. This leaves the selection of a high voltage fuse as the next step.

Since the interrupting capacity of this location is in the order of 1,000,000 kva, a boric acid or high interrupting capacity fuse was selected. By use of fuse templates a fuse rated 65E amperes was selected as the only one that would fit in the space between the transformer curve and the 480 volt fuse.

Fuse study conclusions

The indiscriminate use of fuses is not recommended. Their use should be considered carefully on the basis of actual protection afforded at the particular location. Their deficiencies should be balanced against carrying charges of more expensive protection in addition to some intangible values which may be evident at a particular location.

It is ordinarily important that the fuse have a time-current curve shape in the critical area similar to the safe heating curve for the protected transformer. This is important not only for protection of the transformer but also for grading with other devices in the chain of protection all the way from transmission line to the customer.

Corona damage to fuse elements and their flexible leads may be a serious problem with fuses rated above 22 kv due to moisture and corona action for extended lengths of time. A well designed high voltage fuse, of the expulsion or boric acid type, apparently requires either adequate shielding against corona or seals against moisture.

Fuses, when properly applied, may provide a generally satisfactory degree of protection to the system and to the transformer for external faults near the transformer. This statement is based on careful observation for some 26 years of fuse protected transformers. The author knows of no case in which the failure of a transformer could be attributed directly to fuse performance or misapplication of fuses.

Stadium floodlighting

(Continued from page 22)

a panel board in the stadium office that energizes individual magnetic contactors for pre-game, approach and playing field lights. Each pole, in turn, is equipped with a circuit breaker panel board containing breakers that individually protect the floodlights mounted on it.

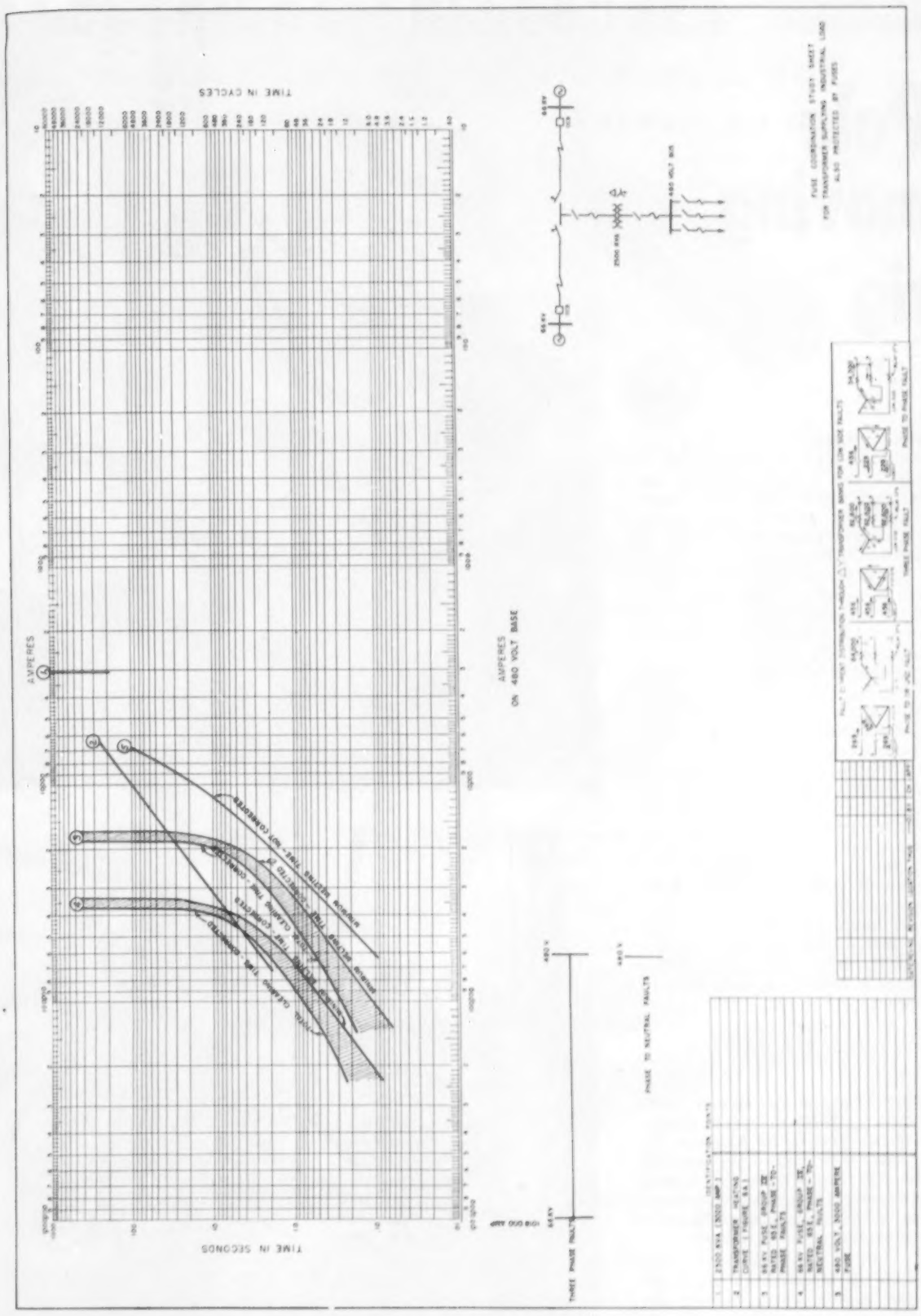


Figure 3. Fuse coordination study sheet for transformer supplying industrial load that is also protected by fuses. Tabulation at lower left identifies lines and curves on time-current chart.

Pole moving rig

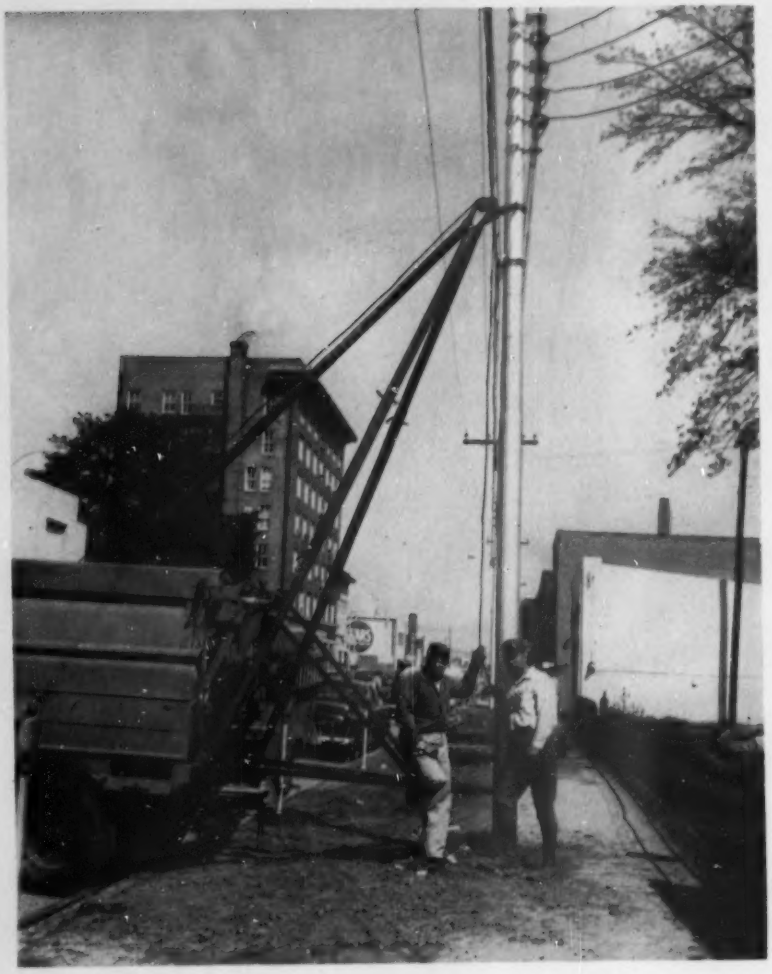
◆ REPOSITIONING distribution system poles with no interruption in service was accomplished by one Carolina Power and Light Company crew with a temporarily rigged triangular brace fixed to the rear of their truck.

The unique device enabled linemen to reset 11 steel poles in a street widening project in just two working days and at about half the usual cost of pole moving.

In operation workers first dug a trench from the base of the pole in its original location to its new position which ranged from two to five feet away.

Once free the pole was lifted by the truck's winch, clamped to the homemade brace, and the pole, insulators and conductors all conveyed into position by the truck moving slowly in reverse.

Sam Harrelson, CP&L line foreman and Tommy Windham, lineman, designed the device which E. M. Geddie, assistant line superintendent, says makes a smoother and less hazardous task of pole moving.



Above: Carolina Power and Light Company linemen, on a street-widening project in Florence, S. C., ease the burden of pole moving with this simple brace for holding poles upright and rigid. Poles were reset without disturbing the lines they carried.

Below: A close-up of the pole clamp device which halved the usual cost of repositioning 11 electric poles in Carolina Power and Light Company territory.

ELECTRICAL ENCLOSURES

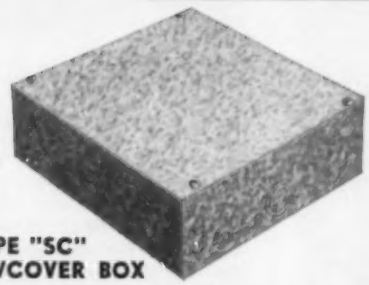
STEEL or ALUMINUM

Contractors, Industrials, Utilities, Municipalities, REA's

CABINETS AND BOXES

TYPE "PF" TELEPHONE CABINET

Surface or Flush Mountings in either galvanized or grey enamel finish. Constructed from the finest steels available, all in compliance with the Underwriters Laboratories specifications.



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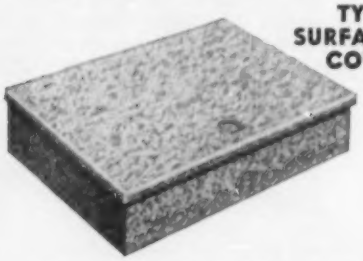
Durable Formed Construction, galvanized or grey enamel finish, with or without knockouts. Sizes to your specifications.

TYPE "A" SURFACE HINGE COVER BOX



All sizes available for electrical cutouts, switches, relays, junction and pull box applications, galvanized or grey—with or without knockouts.

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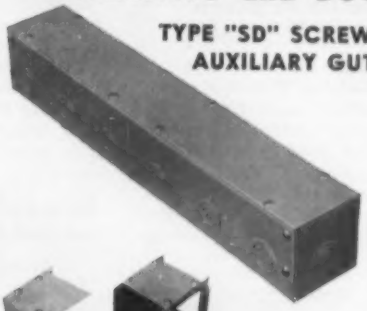
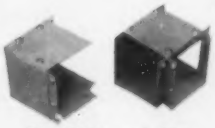
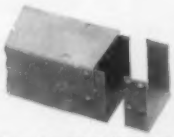
TYPE "SD" SCREW COVER AUXILIARY GUTTERS





ELBOW and TEE



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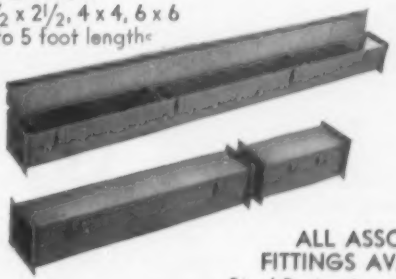
2½ x 2½, 4 x 4, 6 x 6
1 to 5 foot lengths



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Notes on new utility equipment

Current capacity increased by adjustable limit switch

MORE CURRENT CAPACITY can be obtained from General Electric's single-phase step voltage regulators with a new, externally adjustable limit switch, the G-E Power Transformer Department has announced.

Two knobs on the side of a new position indicator permit independent setting of raise and lower voltage

limits at any desired position without interrupting service.

Step regulators can carry more current when their regulating range is limited—an ML32 regulator, built for plus or minus 10 per cent, can carry 160 per cent of rated current (to a limit of 400 amps) at plus or minus 5 per cent regulation.

The new position indicator and limit switch will be supplied on all the company's ML32 regulators, which also have a redesigned control panel and improved facilities for one-man untanking.

Expanding anchor has strength and rigidity

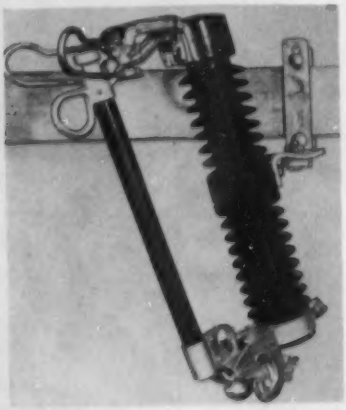
THE "V"-WAY expanding anchor recently announced by Southern Car and Manufacturing Co., P. O. Box 2312, Birmingham 1, Ala., offers a number of special features of interest to distribution and transmission engineers and superintendents. The anchor has V-blades, each with five distinct points that pierce the undisturbed earth with ease, requiring fewer blows with tamping bar to install.

Balanced holding power obtained through V-blade locking with V-base reduces slippage and creepage, the manufacturer reports. A four-page illustrated folder is available upon request, describing the "V"-Way expanding anchor as well as illustrating screw, cone, and plate anchors that are also available from Southern Car and Mfg. Co.

New 27-kv HDO cutout offered by Line Material

A 27-KV 100-AMPERE open fuse cutout has been added to the HDO family of distribution cutouts manufactured by Line Material Co., Milwaukee, Wis. It has been designed principally for use in 14.4/24.9-kv grounded wye systems.

This 27-kv unit is offered with a normal-duty fuse cartridge with solid cap for single-vented operation or an extra heavy-duty expendable cap for controlled double-vented operation. Interrupting capacity is 1200 amperes with the solid cap or 4000 amperes with the expendable cap. Also available is a load break device that enables dependable link breaking ac-



tion for all links up to 100 amperes. Safe, positive interruption of load currents up to 100 amperes is assured.

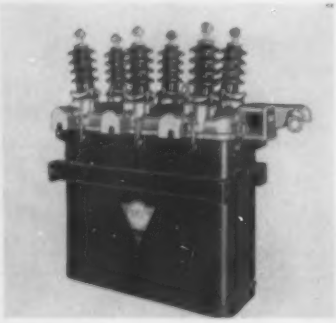
The 27-kv unit has a single insulator support and an EEI-NEMA hanger. Its features include corrosion-resistant galvanized steel hardware, silver-plated contacts, a collapsible hinge for drop-down operation, and a hinge shunt contact.

The complete HDO family offers 100-ampere cutouts having interrupting capacities of 3000, 5000, 6000, and 10000 amperes at 5.2 and 7.8 kv; 2000, 4000, and 8000 amperes at 15 kv; and 1200 and 4000 amperes at 27 kv. For use as disconnect switches, HDO units are available with 200-ampere blades.

New intermediate-duty three-phase recloser

A KYLE TYPE 6H oil circuit recloser has been designed to fill the demands for a three-phase intermediate-duty interrupter rated 2.4 to 14.4 kv. Line Material Co., Milwaukee 1, Wis., has previously offered the Type 3H and Type R three-phase reclosers for standard-duty and heavy-duty applications, respectively.

The Type 6H is a power class recloser that will supplement the distribution class Type 3H recloser on



systems requiring greater load and interrupting capacities. Adaptable for pole or substation installation, it will co-ordinate with other Kyle reclosers. Available with load current coil ratings of 5, 10, 15, 25, 35, 50, 70, and 100 amperes, the 6H provides a maximum interrupting capability of 3000 symmetric amperes or 4200 asymmetric amperes at 4.8 kv. BIL is 110 kv.

Timing in the 6H is performed by a time proven hydraulic mechanism. For positive interruption, the Type 6H recloser incorporates a newly designed cross-blast arc-extinguishing device. Simplified adjustments facilitate field selection of the tripping sequence, operations to lockout, and operating characteristics (fast and/or retarded or extra retarded). Each phase unit trips individually, but lockout of one phase causes simultaneous lockout of all phases.

Sensitive HiPot tester announced by Peschel

AN IMPROVED LINE of sensitive Hi-Pot testers which automatically de-energize high voltage when leakage current in samples reach 5 micro-amps has been announced by Peschel Electronics Inc., 17 Garden Street, New Rochelle, N. Y.

Models are available from a 2 kv up to 120 kv and special units can

Dependability and Safety
590 MEANS ST., N. W. • ATLANTA, GEORGIA

be custom built. The smaller units are adjustable up to 1000 microamps and larger units up to 5000 microamps.

The new Series "H" tester avoids the brute force method of burning up fine equipment and components when testing for leakage. HiPot testing allows convenient and accurate dielectric testing of equipment, components and materials. With the new Series "H" tester, the high sensitivity

shows up leakage currents in insulation which appear to be perfect on less sensitive instruments.

Standard features include both a-c and d-c outputs and continuously adjustable output voltage. Accurate hand calibrated dual scale metering which is directly across the HV output can be recalibrated at any time by a simple screw driver adjustment. A selfholding primary contactor prevents the accidental reapplication of high voltage after a line failure. The unit is complete with full safety controls, dead-front panel controls and safety resistor in d-c output lead.

New hydraulic tank lifter with battery powered pump

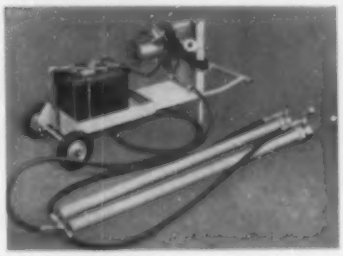
A NEW ECONOMICAL hydraulically operated tank lifter, which substantially reduces the time and labor involved in raising and lowering oil-filled tanks of frame-mounted, outdoor oil circuit breakers, has been developed by Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis.

The new lifter consists of two cylinders containing pistons and a length of flexible hose with quick disconnect couplings. It can be operated directly from the "Pneu-Draulic" operator of the breaker, or from a portable battery powered pump. When operated from the breaker, it connects to the breaker's hydraulic system through a small door in the side of the breaker cabinet. From this vantage point it is possible to have a complete and unobstructed view at all times.

Two manually operated needle valves control the raising and lowering of the tanks which can be safely stopped at any point. An orifice in each cylinder limits the maximum speed at which the tank can be lowered or raised. Should a hydraulic hose or fitting be removed or broken during operation, the tank descends at normal speed until completely lowered. The accumulator of the "Pneu-Draulic" operator contains enough energy at normal operating pressure to raise and lower all three of the breaker's tanks without requiring recharging.

Cylinders of the tank lifter are attached to the breaker frame by removing two opposite tank bolts and inserting the cylinder ram through the tank and frame bolt holes. The nut is threaded onto the ram and pressure applied to the cylinders. This pressure supports the tank tightly in the "up" position while the other tank bolts are removed. Pressure within the cylinder is then released by means of the exhaust control valve and the tank is lowered at a controlled speed.

In raising the tank, pressure is allowed to enter the cylinder by means of the pressure control valve. The tank then rises at a controlled speed to the "up" position where it is supported by pressure within the cylinders while the tank is bolted securely. The pressure is then reduced and the cylinders removed. An oil-filled tank can be completely raised or lowered within 40 seconds after the operation has been initiated.



The portable battery operated hydraulic tank lifter is designed for use with solenoid and pneumatic operated intermediate capacity, outdoor oil circuit breakers. It consists of a small piston-type pump driven by a standard, 120-ampere-hour, 6-volt battery through an automobile starter motor, together with a reservoir and by-pass valve. It is capable of raising and lowering the tank 60 times at normal speed without recharging. Total weight of the entire portable unit is only 85 pounds.

Electrical joint compound packaged in squeeze bottle

ALCOA No. 2 electrical joint compound, which removes oxide film from aluminum or copper electrical conductors and fittings, is now packaged in a handy plastic squeeze bottle, by Aluminum Co. of America, 1501 Alcoa Building, Pittsburgh 19, Pa.

The new container holds eight fluid ounces and is oval in shape to prevent rolling. The squeeze bottle is easy to carry and to use on the job. Each bottle is delivered sealed. To use, pull off the cap and nip off the spout. The bottle is recapped like a household oil can.

Alcoa No. 2 electrical joint compound removes oxide without corrosive effect on the metal itself. After application, the compound, insoluble in water, remains to seal and protect the joints and prevents re-forming of the oxide.

Electrical joints, when properly assembled with Alcoa No. 2 electrical joint compound, are in the same range of contact resistance as silver-plated joints. Excellent connections can be made with aluminum to alumnium or aluminum to copper.

The compound, with its squeeze bottle, is another product of the research and development laboratories, Aluminum Company of America. The new plastic bottles now are available in cartons of 12. Also available for bulk users are 25-pound sealed pails or one pint cans.

Supervisory control system in 25, 50-point capacities

A NEW SUPERVISORY control system, called Type DOS-3, has been announced by Motorola, Inc., 4501 W. Augusta Blvd., Chicago, Ill. According to the manufacturer, this system is designed to provide reliable, economical, and compact centralized control for petroleum pipeline pumping stations, off-shore petroleum gathering installations, electric power stations and railway systems. With Type DOS-3 equipment, one operator can supervise and control many valves, pumps, motors, generators or any other devices which can be operated electrically. The new equipment is available in two ultimate capacities, 25 and 50 points.

This new system with combined "select-and-operate" control and automatic interrogation indication is designed to permit serving many remote stations economically. Only a small amount of common equipment is required for each station. The number of remote stations that can be served is limited only by the ultimate capacity of the system. For example, as many as 50 remote stations can be

served by the 50-point system.

Other design features include "building block" packaging to permit custom design and system flexibility; automatic alarming and memory circuit; and fast selection and operation. A special optional feature is the increment control that permits degrees of "open," rather than the conventional two-position "open-close" control.

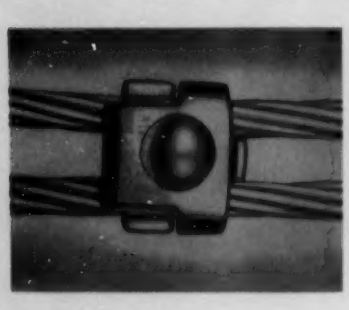
The complete 25-point system for d-c operation requires only one case 17½" x 12¼" x 8¾", plus panel space for escutcheon plates. Two of these cases house the basic equipment for the 50-point system. Equipment mounts on a standard 19" relay rack. Either system can be operated from 48 or 125 VDC. With an appropriate power supply, this equipment can also be operated from 117 VAC.

The new Motorola equipment permits a wide selection of communication media. Any type of communication channel that permits three degrees of freedom and transmission of up to 10 pulses a second can be used. For economical operation in a multistation system, it is possible to use a two-wire line to connect all stations on a party-line basis.

New parallel groove clamp for bi-metal connections

A NEW "AGP" parallel groove clamp design — for making aluminum-to-copper, aluminum-to-aluminum, copper-to-aluminum, and copper-to-copper connections — is now being marketed by the A. B. Chance Co., of Centralia, Mo.

This aluminum-bodied design is protected with a heavy fortified cadmium-coating that wards off oxidation and corrosion between unlike metals. The heavy cadmium-coating



over the whole connector eliminates the possibility of a lineman accidentally putting the connector on wrong when making bi-metal connections.

Available in three sizes, this Series 200 clamp features interlocking contacts for both main line and tap. All strands of the conductor are thus supported and contacted by the clamp, giving a positive, high-conductivity connection. This all-strand contact is maintained throughout the entire size range of each clamp. The 200 Series clamp is also made without the cadmium coating for aluminum-to-aluminum connections only.

Network protector of advanced design

A 3,000 ampere network protector of advanced design has been developed by the Low Voltage Switchgear Department of General Electric Co., Schenectady 5, N. Y.

Designated the MG-90, the network protector operates on voltages of 120/208 and 277/480. Housed in a dust-proof enclosure and protected with Class H insulation, the MG-90 is designed for long life under ex-

treme operating conditions and features high loading capacity built into a small unit.

A minimum current is required to close the protector which operates on stored energy provided by a motor driven mechanism. Relays, fuses, and contacts are easily accessible.

Many safety problems involved in 277/480 volt networks are alleviated by use of a 120/208 test voltage on the protector, relays, operating mechanism and auxiliary circuits. Testing can be performed with the usual safety precautions for handling 120/208 voltages. Another advantage to the user is the standardization of replacement parts.

Single-unit bolt and washer gives more area, tight hold

A NEW BOLT for crossarm brace attachment at the arm has been introduced by Hubbard and Co., Pittsburgh, one of the world's largest manufacturers of pole line hardware.

Bolt and washer are combined in

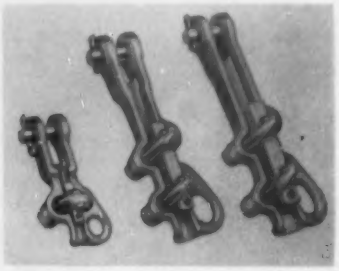
a single unit. This provides a wrench hold that is lacking on the usual carriage bolt, making it less likely for a bolt to turn instead of tighten when the wood of the arm is soft or when excessive wrench power must be applied because of rough threads. The "built in" washer provides more area than the head of a carriage bolt, reducing the possibility of burning and of other difficulties encountered with smaller heads.

The bolt is ⅜ inch by 4½ inches under the head, with a 1¼-inch thread. The integral washer is of 31/32-inch diameter.

Improved keeper piece on Strateline clamps

OHIO BRASS CO., Mansfield, Ohio, announces that aluminum Strateline clamps for deadening distribution lines now feature a keeper piece attached permanently to the U-bolts. This decreases the number of loose parts and facilitates "hot line" installation and maintenance work.

Each of the three sizes of clamps is equipped with ½-inch U-bolts to per-



mit tightening torques of 600 inch-pounds needed for full holding strength for this type of clamp. Small "ears" on the keeper piece grip the U-bolts and hold them in special flanges to insure correct alignment during installation.

"J"-type binder strip protects trough cables

A NEW "J"-TYPE binder strip has been announced by T. J. Cope, Inc., of Collegeville, Pa., to secure the top edges of the Cope expanded metal cable trough system and to protect the power and control cables.

The new inverted "J"-type binder strip replaces an inverted "U"-type binder strip. The binder strip is #16 gauge steel and is projection welded to the top edges of the trough. The "J" design allows one electrode to come in contact with the expanded metal and also permits the pickling acid to drain out after galvanizing, thus insuring a strong and rigid contact that increases the structural strength of the trough. Cables are protected at connections by a bottom plate that fits over the bottom edge of the trough.

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News of the industry

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Utility group elects officers

L. G. WISELEY, superintendent of Purchases and Supplies, Michigan Consolidated Gas Co., was elected chairman of the Public Utility Buyers' Group, National Association of Purchasing Agents, at the National Convention held in Cleveland recently.

Other officers elected were Harold T. Belcher, Consumers Power Co., Jackson, Mich., first vice-chairman; R. H. Sperreng, Union Electric Company of Missouri, St. Louis, Mo., vice-chairman; J. J. Morse, New Orleans Public Service, Inc., New Orleans, La., vice-chairman; and J. B. Homsher, Gilbert Associates, Inc., Reading, Pa., secretary-treasurer.

The group will hold its 26th Annual Mid-Winter Conference at the Brown Hotel, Louisville, Ky., February 3-5, 1957.

The Public Utility Buyers' Group — the largest single group within the National Association of Purchasing Agents — represents over 300 utility companies.

Four Southern states now have CLP Bureaus

THE CERTIFIED LIGHTING PROGRAM, developed by the National Lighting Bureau, is now being sponsored by 17 lighting bureaus throughout the nation. The program includes training courses for electrical contractors and journeymen, and the promotion of Certified Lighting.

Thirteen of the bureaus have given from one to four training courses so far. Four bureaus are setting up training programs now. All 17 bureaus plan to run classes in the Autumn.

The 17 local CLP Bureaus have mushroomed across the country. Four of the bureaus are located in Southern states with headquarters in Chattanooga, Tenn., Charlotte, N. C., New Orleans, La., and Jackson, Miss.

Ten local bureaus have trained and graduated a total of 680 individuals. Twelve bureaus have a current enrollment totaling 681 enrollees.

Six bureaus have reported the installation results of their Certified Lighting Programs to March 31, 1956. They are summarized in the accompanying table.

Certification Results
to March 31, 1956

Bureau	Jobs Installed	Fixtures		Kilowatt Load	
		Total	Average/Job	Total	Average/Job
Rhode Island	80	4699	52	769	9.6
Eastern Mass	212	7854	37	321.2	6.2
San Diego	12	601	50	178.9	14.9
Northern Calif.	13	363	28	79.26	6.1
Cincinnati	1	85	85	16.15	16.15
Detroit	1				

Although the bureaus have been in operation only a short time there is ample evidence that good results are being produced. Southern bureaus had not been in operation long enough to report for this tabulation.

New CPL power plant for Rio Grande Valley

PLANS FOR THE construction of a new $7,000,000 power plant in Rio Grande Valley of Texas have been announced by Central Power and Light Company, Corpus Christi, Tex.

CPL president J. L. Bates said actual construction work on the project will begin in January, 1957, with the plant scheduled to begin operation in early 1958.

The new plant will have an initial generating capability of 66,000 kilowatts. CPL plans to add additional generating units to the West Valley Plant as the load in the area grows.

The new generating station will be the second CPL plant in the Rio Grande Valley, and the 13th in the company's system. The plant will be located near Mission, in the western end of the Valley.

All major equipment for the new power station has been on order since late 1955 and preliminary engineering work on the project has been underway since that time by Sargent and Lundy of Chicago. The company will solicit bids for the construction contracts in September or October.

With the completion of the new plant, CPL will be able to supply 597,000 kilowatts of electricity, more than five times as much as 10 years ago. High customer demand to date has been 399,000 kilowatts in the summer of 1955.

Annual FAEC convention at Miami in October

THE 1956 Annual Convention and Show of the Florida Association of Electrical Contractors will be held October 24-27 at the Balmoral Hotel, Miami Beach.

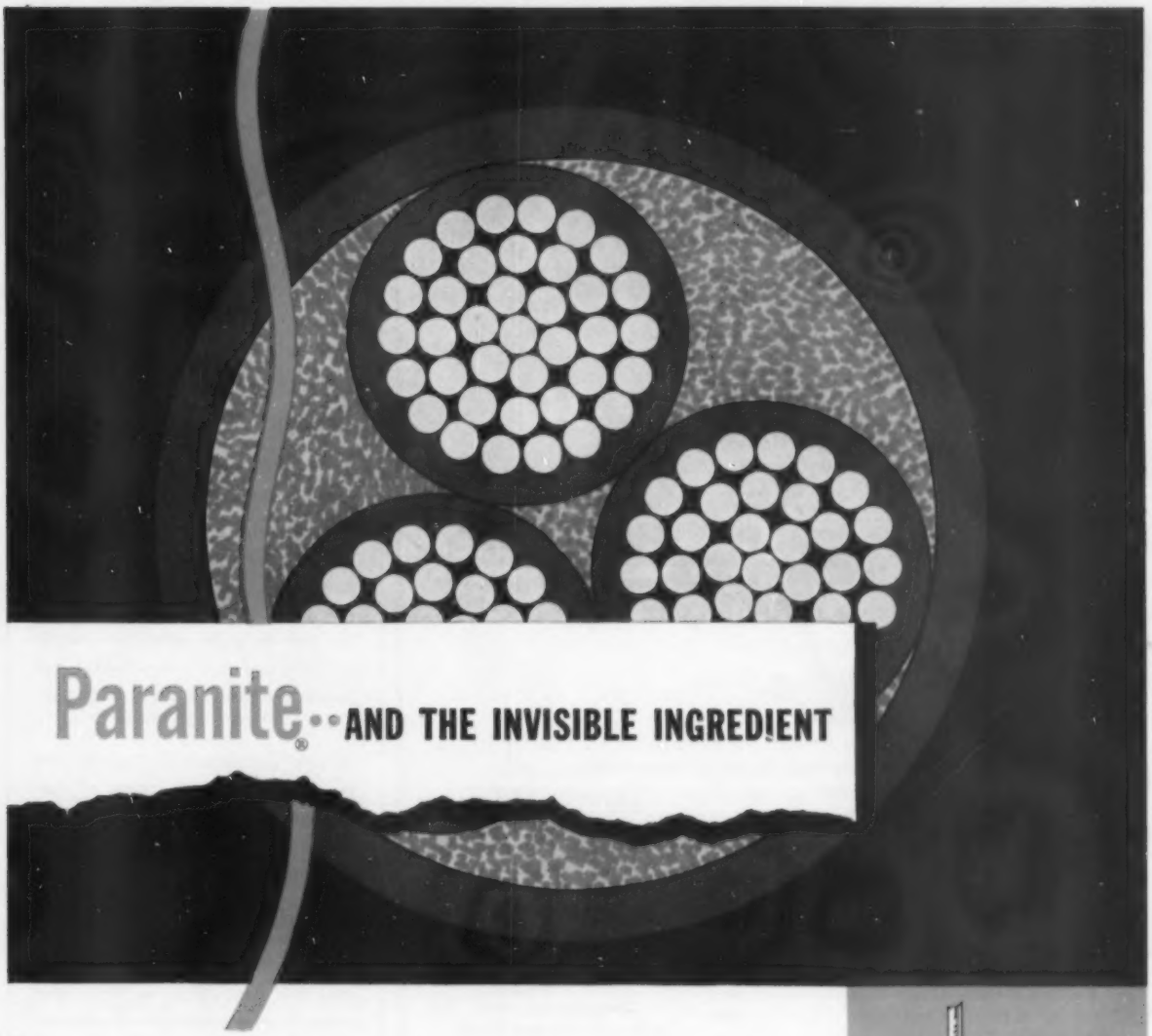
James Dandelake, of Miller Electric Co., Jacksonville, is convention chairman. James Lowry, of Lowry Electric Co., Coral Gables, is a member of the convention committee. The third member of the committee will be appointed from the Broward County Chapter by FAEC president Howard L. Palmer. Secretary-treasurer H. A. Lilly will handle all convention funds and state manager L. L. Dick will handle the sale and allocation of exhibit booths. About 70 booths will be available for the Electrical Material Exhibit.

Vast project promotes all electric living

A PLANNED 300 home suburban development near Raleigh, Lake Forest, will be the first such enterprise to offer completely all electric living for prospective home buyers in North Carolina.

Already opened to fascinated pre-viewers, an all electric model home, recently compieted by builder C. Griffith, has attracted more than 50,000 visitors since Mr. Griffith announced plans for the vast project in electric living.

Tops in eye appeal and convenience, the $30,000 prototype home is completely equipped with an all electric kitchen, individually designed room lighting, adequate



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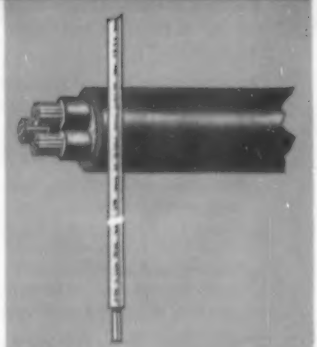
True in past years—more true today! The "invisible ingredient" still silently assures you that every foot of Paranite Wire and Cable is as nearly perfect as human hands can make it . . . utilizing modern equipment and cautious testing.



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2. Substitute ¼" Extra High Strength Strand—rated 6650 lbs. PLP Guy-Grips make this possible since they hold the full rated strength of E.H.S. Strand. The following strand savings result (current cost of ⅜" galvanized strand is $2.24 per guy while ¼" E.H.S. costs $1.36 per guy)*: **SAVING: $.88 per guy**

TOTAL STRAND SAVING ALONE: $1.55 per guy

3. Preformed Guy-Grips cost only $.55 each for ¼" E.H.S. Strand size. (PLP Cat. No. 25 GDE-¼") **Compare this cost with your current fitting.**

In every Preformed Guy-Grip installation, you hold the full strength of the strand.

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wiring (100 amp mains), and cheerful outdoor garden lighting.

An intercom system pipes music and voice to every room, adding a note of luxurious convenience. And a three-ton, water-to-air type heat pump captivated the thousands who threaded their way through the model home on opening day. Although the developers are offering complete electrical facilities as a "package deal," the heat pump will be installed at the purchaser's option when construction starts.

Wiring, electrical facilities, and other features of the model home were designed cooperatively by the builders and Carolina Power and Light Company salesman Ray Daniels. Mr. Daniels was active in influencing builder Griffith's investment in the potentialities of Lake Forest, and looks to the 300 projected homes as immediate and sustained load builders.

The CP&L sales force, in addition to planning the electrical features of the model home, called in advertising representatives to map out a campaign to acquaint the public with the unique project.

Opening day for the model home was billed in local newspapers over CP&L's signature as "Twenty-First Century Living," with the emphasis on "Raleigh's first completely all electric model home."

Subsequent ads and publicity focused almost daily attention on the desirability of electrical living. Also on hand at the building site were CP&L representatives who conducted tours through the model home and explained its many conveniences.

Builder Griffith and his staff are jubilant at the public acceptance of their all electric experiment. Similar expressions are heard from CP&L folks since the project has been so thoroughly identified as all electric.

"It's a cinch to sell electric living," says Mr. Daniels, "when you let the customer see it in operation."

IES packet features home lighting ideas

IN KEEPING with the reawakening trend toward installed lighting in homes, such as with decorative valances, recessed and cove fixtures, and other types in general living rooms, the Illuminating Engineering Society has published a new packet of their well-known Home Lighting Data Sheets, featuring the newest ideas in kitchen and bathroom lighting.

"Home Lighting Ideas for Kitchens and Bathrooms" includes room and lighting layouts for typical kitchen and bathroom arrangements, remodeled as well as new

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THIS is the story of a queen of many kingdoms. A lady of quality, she is acclaimed as a wonderful business girl, the perfect housekeeper, and a perfect companion. Her romances are known to all of you, for they are the romances of your business kingdom.

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construction, with complete instructions and installation data for the lighting systems. Among the latest types of lighting shown are recessed soffits and coves, louver-all and luminous ceilings (particularly adaptable to the comparatively small areas of these rooms) as well as standard fluorescent and incandescent fixtures. Ten different rooms are covered and data include dimensions and floor layouts for each, with all necessary information concerning the name of manufacturer and catalog number of fixtures employed, wattage and color of lamps, and construction details.

The new home lighting packet is valuable to architects, electrical contractors, lighting specialists, designers, residence lighting engineers, in fact anyone concerned with modern lighting in the home. Copies of "Home Lighting Ideas for Kitchens and Bathrooms" may be obtained from Publications Office, Illuminating Engineering Society, 1860 Broadway, New York 23, N. Y. Single copies are 50¢; quantity prices on request.

Curtis announces new sales agent

THE APPOINTMENT of Joe Perry, Jr., of Atlanta, Ga., as sales representative for Curtis luminaires in Georgia, northern Alabama and eastern Tennessee, has been announced by John A. Wright, president of Curtis Lighting, Inc.

Mr. Perry received his schooling at Oglethorpe University. His entire career has been spent in the electrical business, with earlier experience including twelve years with the Miller Company and six years with the General Electric Supply Co. Mr. Perry's associate in Alabama is Mr. William H. Neville, of Birmingham, who enjoys the distinction of being the first lighting representative to sell lighting equipment in the state of Alabama.

Research survey conducted by EEI

BELIEVEING THAT effective research is of great importance to the continued growth and progress of the electric power industry, the Board of Directors of the Edison Electric Institute at its recent meeting decided to undertake a survey of research work being done by its member companies.

The objectives of this program are several. Determine the amount and type of research now being conducted or sponsored by EEI member companies, and the more important projects undertaken since 1950. Promote the exchange of information between companies in regard to their present research activities and the results thereof so as to obtain maximum benefits and to minimize duplication of research effort. Secure favorable publicity as appropriate and in good taste so as to emphasize the scope and important results of research work sponsored by the electric industry.

This project will be under the general direction of the EEI Research Projects Committee, the chairman of which is C. W. Franklin, Consolidated Edison Company of New York, Inc. The work will be conducted by Mr. Howard P. Seelye who has been active in EEI work for many years and who recently retired from the position of manager of engineering of The Detroit Edison Co. His services have been engaged as a consultant for this purpose.

Atlanta assembly plant planned by Square D

SQUARE D COMPANY will construct an electrical equipment assembly plant in Atlanta as the base of expanded operations in the Southeast, Gordon Patterson, president, has announced. The company's field engineering offices in Georgia, Florida, Alabama, and other area states are also expected to be increased as the expansion program develops, Mr. Patterson said.

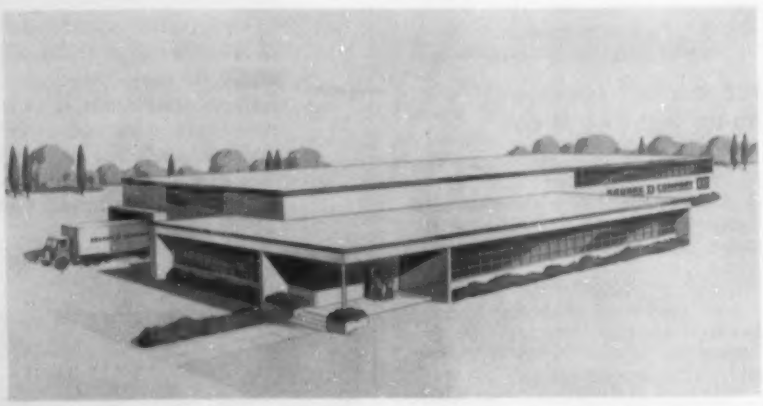
Construction of the Atlanta plant in a new industrial development in the city's northwest section — on Marietta Boulevard south of Chattahoochie Street — is scheduled to begin in a few weeks. Involving an investment of $500,000 and designed to permit future additions, the 31,000 square foot structure will house Square D's regional headquarters offices now located in Atlanta, as well as provide production facilities.

Square D is one of the nation's largest manufacturers of electrical distribution and control devices including circuit breakers, switchboards and motor starters, and has major plants in Detroit, Milwaukee, Cleveland and Los Angeles. Square D's directors include A. A. Schlesinger, chairman of Newport Industries, Inc., Pensacola, Fla., and other businessmen prominent in U. S. industry.

In his statement Mr. Patterson expressed the belief that "the Southeast is on the threshold of a whole new era of raw material development, industrial growth, and agricultural modernization."

Mr. Patterson added, "We are backing this conviction with the steel and stone of new construction and with the corporate energies to help make it come true — we intend to become an increasingly important job-making, tax-paying factor in the Southeast's economy."

James Vaughn, vice-president of Square D Co., will direct construction of the new Atlanta plant.



Artist's drawing of the 31,000 sq. ft., half-million dollar plant scheduled for completion late this year in Atlanta, Ga. The structure will house regional sales offices and production facilities.

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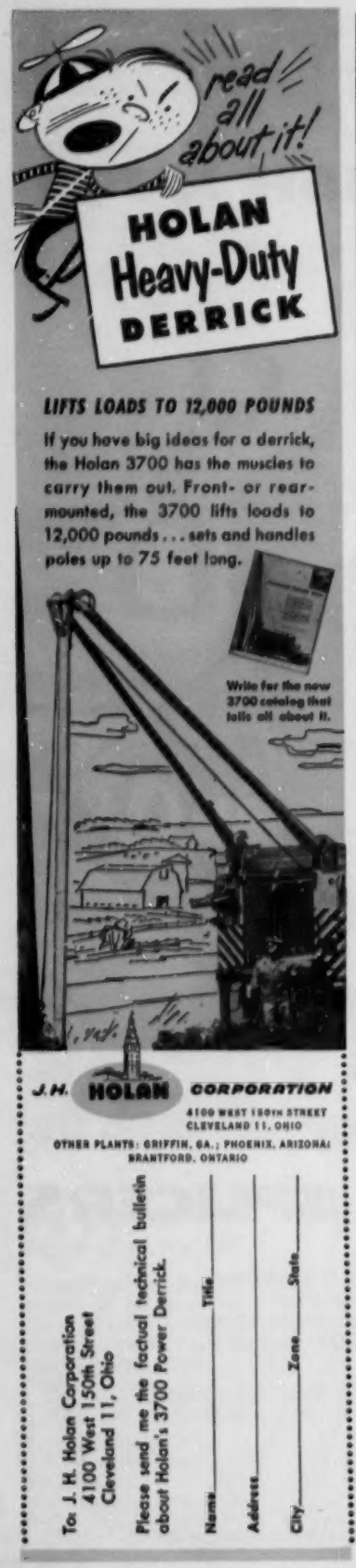
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Cable sheath reports to be published soon

A REPORT on stray current electrolysis and one on cathodic protection of cable sheaths are being prepared for early publication by the National Association of Corrosion Engineers, 1061 M & M Bldg., Houston 2, Texas. NACE Task Group T-4B-6 on Stray Current Electrolysis has completed the first report while Task Group T-4B-2 has finished the other. Both are scheduled to appear before the end of 1956.

The stray current report includes a section on cable bonding, bonding to other utilities and insulating joints, a section on drainage to railway substations and booster drainage, and a section on reverse current switches and valve rectifiers. Numerous bonding and grounding specifications used by utilities are included.

The cathodic protection report has sections on protective criteria, rectifier ground bed locating and design, installation of galvanic anodes, rectifier characteristics relative to lead sheath cable protection, insulating joints and protective coatings. Also covered are power sources, types of anodes, installation methods, protection coordination, interference filters, surge and lightning protection. Over 40 drawings of cathodic protection installations are included.

MP&L report predicts continued expansion

IN HIS RECENT report to stockholders, Baxter Wilson, president of Mississippi Power & Light Co., Jackson, Miss., stated "the first quarter's experience promises a continuation of industrial development and generally good business conditions throughout the entire year."

He mentioned that the Community Development Program inaugurated by the company in 1955 continued to gain momentum. Mr. Wislon said, that 41 cities and towns in the company's territory are being assisted in formulating plans to make each a more desirable place to live, and more attractive to industry.

With reference to recent State legislation affecting the company, Mr. Wilson said, "the legislature during the recent session expanded the jurisdiction of the Mississippi Public Service Commission to include electric and gas companies." He said, "our company has always favored fair regulation, and does not object to transfer of regulatory functions from local to state level."

Mr. Wilson feels that the new law will help to continue good cooperation between state officials and the company for the attraction of new capital to the state.

"However," said Mr. Wilson, "the company does object to the provision of the act which permits federally financed electric cooperations to construct and extend their tax-free electric facilities inside the corporate limits of municipalities. In many instances, these facilities parallel and duplicate the company's existing and fully taxed facilities.

"This government subsidized competition by tax exempt REA co-operatives for urban customers, to whom electric service is already available from an investor-owned, tax-paying utility is not only eminently unfair, but also is a far cry from the intent of congress, when creating the Rural Electrification Administration," he said.

Plans announced for joint power project

PLANS FOR THE construction of a gigantic new steam-electric generating plant, to be owned jointly by the Georgia Power Company and the Alabama Power Co., were announced recently by Harllee Branch, Jr., president of the Georgia Power Co.

The new plant, with an expected ultimate capacity of one million kilowatts, will be constructed on the Coosa River, near the coal fields of Alabama, in order to take advantage of low-cost fuel available in that area, Mr. Branch said. He pointed out that the Coosa River location will put the plant within easy reach of many of Georgia's largest load centers and that, as a result of improvements in the art of transmitting power, it is now cheaper to ship electricity into Georgia over transmission lines than to transport coal from distant mines.

Application has been filed with the Georgia Public Service Commission for approval of the preliminary steps looking toward construction of the plant. Similar applications were also filed with the Securities Exchange Commission, at Washington, and with the Alabama Public Service Commission, at Montgomery.

The first power installation will consist of two 250,000-kilowatt steam-electric generating units, representing an initial investment of about $75 million. These units are scheduled for completion in 1961. Two additional units of like size are expected to be installed by the end of 1963, giving the new plant its ultimate capacity of one million kilowatts. Total cost of the plant is estimated at about $150 million.

The plant will be built and op-

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That call will put one of Graybar's trained lighting experts virtually on your own staff. Through him you can take advantage of the years spent in lighting research by dozens of manufacturers who are Graybar suppliers.

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erated by a new company known as Southern Electric Generating Co., which will be financed by The Southern Company investing approximately 25 million by 1961 in the common stocks of the Georgia and Alabama power companies which, in turn, will invest these funds in the common stock of the generating company. Additional construction funds will be obtained by the generating company through the issuance and sale of debt securities. The Georgia and Alabama companies will share equally in the power output of the new plant.

Mr. Branch said the plant will make available a new and economical source of electricity to meet the future power needs of Georgia and Alabama consumers. He estimated that the location of the plant near the coal deposits will save the Georgia Power Company between $3 and $4 million a year when the full million-kilowatt capacity of the plant is available. He pointed out, however, that these savings will apply only to the new capacity being installed to supply future power requirements. Power costs at existing plants, which will continue to carry the great bulk of the company's load, will not be affected.

"We are trying to stave off the inevitable rise in power rates which would result from locating this new capacity in our own area," he said. "At the same time we are doing everything we can to keep expenses down at our existing plants."

G-E announces new Southern plants

PLANS HAVE BEEN announced by General Electric Company to construct an electronics plant in the St. Petersburg-Clearwater, Fla., area, and to establish a new plant in Lynchburg, Va. to house the G-E Rectifier Department.

The proposed electronics plant, the first G-E manufacturing facility to be constructed in Florida, will produce electronics equipment for Sandia Corp., Albuquerque, N. M., prime contractor to the Atomic Energy Commission, according to John H. Smith, general manager of the General Electric X-Ray Department, which will operate the new facility.

The Florida plant will employ from 600 to 700 men and women and will have an annual payroll of about four million dollars. Construction will begin within the next two weeks and the plant is scheduled to begin operation by December 30, 1956.

A general contract has been awarded for construction of the new Lynchburg, Va., plant for the G-E Rectifier Department and present plans call for completion by early spring of 1957. Long range plans showed the need for relocating the Rectifier Department, with present headquarters in Lynn, Mass., to accommodate the needs of other growing departments in Lynn.

The Lynchburg plant, providing in excess of 250,000 square feet of office, manufacturing and laboratory space, will eventually employ about 1000 persons. It will occupy a 100 acre site two miles beyond the Lynchburg city line.

Mobile display for street lighting units

"WHAT WILL this luminaire look like on our street? What kind of lighting job will it do?" These are questions a Line Material lighting engineer can now answer with an "on-the-spot" demonstration. Using a mobile display unit, the engineer can mount and illuminate an incandescent, mercury vapor, or fluorescent lamp and luminaire on a special street lighting standard. He can simulate an actual installation within a few minutes, or he can demonstrate several types of equipments mounted on display panels.

The mobile unit is completely self-contained. In addition to luminaires and supports, it has a gas-driven 120 volt generator and an aluminum standard. Segmented for easy erection on the mobile unit, the standard provides a 25-foot mounting height for a luminaire.

According to S. Standley, product manager for street lighting, no formal nationwide tour is planned. Instead, the mobile unit is being scheduled to fill customer's requests.

A Line Material engineer points out features of the illuminated Ovalite luminaire displayed on a panel of the company's mobile street lighting demonstrator. A four-lamp fluorescent is shown on the aluminium standard.

NEMA offers film on electric heating

AN INDUSTRY-SPONSORED full-color sound-slide film, "Heat Your Home Electrically," is now available for the first time. The film is produced by the Electric House Heating Equipment Section of NEMA.

Specific in its treatment, yet general enough so it can be used anywhere, the film is ideal for showings to service clubs, church groups, prospective home owners, and at PTA meetings and utility demonstrations. It's a potent sales tool for utility salesmen, electrical contractors, distributors, builders — anyone interested in selling electric heating.

The complete package includes 96 colorful picture frames on a standard 35 mm. filmstrip, companion recording on a standard 33 rpm long-playing 16-inch vinyl record to be played simultaneously with the filmstrip, and 100 attractive pamphlets containing supplementary material for audience handout. Price of the complete package is $15.00 each, or $12.50 each in quantity orders of 10 or more.

The film may be obtained from Electric House Heating Equipment Section, NEMA, 155 East 44th St., New York 17, N. Y.

Generating capability now at all-time high

AN-ALL-TIME HIGH record in construction of electric power generating facilities in the United States is shown in the latest power survey of the Edison Electric Institute. During 1955, new generating capability placed in commercial operation totaled 12.5 million kilowatts, or nearly 17 million horsepower, the most ever added in a single year.

Next highest figure was for 1954, when additions amounted to about 12 million kilowatts.

The report, the 19th in a semi-annual series started in 1947, was prepared by the Institute's Electric Power Survey Committee which is headed by Arthur S. Griswold of The Detroit Edison Co. The most complete study of its kind, the survey includes forecasts of peak power demands and supply capabilities, on a regional and national basis. It also presents information on electric power equipment manufacturing capacity and pro-

Specify PHELPS DODGE HABIRITE-INSULATED ARMO-LOK CABLE

Phelps Dodge Armo-Lok cable with Habirite (butyl rubber) insulation—a companion to Phelps Dodge Varnished Cambric insulated interlocked armor cable—is more than "just another interlocked armor cable."

Habirite—developed through years of Phelps Dodge experience in the design and manufacture of high voltage cables—is a specially engineered butyl rubber compound. It far surpasses any other type of rubber insulation for dependable service.

Habirite offers these distinct advantages over other rubber insulations:

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- Far greater resistance to ozone found around high voltage equipment.
- Far greater mechanical toughness.
- Better electrical properties affording a greater safety factor in operation.
- Highest uniformity due to controlled uniformity of raw material.

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See your Phelps Dodge distributor for information on a complete Armo-Lok system. For catalogue and specification data on Habirite or Varnished Cambric insulated Armo-Lok cable, write: Dept. ES-7, Phelps Dodge Copper Products Corporation, 300 Park Avenue, New York 22, N. Y.

PHELPS DODGE COPPER PRODUCTS CORPORATION

SALES OFFICES: Atlanta, Birmingham, Ala., Boston, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Fort Wayne, Greensboro, N. C., Houston, Jacksonville, Kansas City, Mo., Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Ore., Richmond, Rochester, N. Y., San Francisco, St. Louis, Seattle, Washington, D. C.

B-M INDENTER TYPE FITTINGS

FOR E.M.T.
Concrete-tight

Red Throat
Insulated
Connector

Red Throat
Cross section

Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job.

All B-M Indenter Fittings are U.L. Approved as concrete-tight and for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

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BRIEGEL METHOD TOOL CO.

GALVA • ILLINOIS

Warehouse Stocks in Principal Cities for Immediate Delivery!

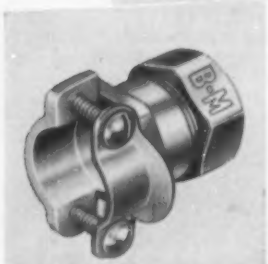
B-M COMPRESSION TYPE FITTINGS
FOR E.M.T. Rain-tight

SIZES FROM ½" to 2"

SIZES FROM ½" to 2"

SIZES ½" ¾" 1"

SIZES ½" ¾" 1" 1¼"



SIZE ½"

BRIEGEL METHOD TOOL CO.
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duction. The periodic survey is prepared in cooperation with power systems throughout the country, as well as the manufacturers of equipment.

Total generating capability of U. S. electric power systems at the end of 1955, as shown in the report, was 116 million kilowatts or more than 155 million horsepower. The U. S. produces about 42 per cent of the electric energy generated in the entire world.

Other highlights of the report included some forecasts and projections through 1959. Generating capability of the nation's electric power systems at the end of 1959 —less than four years from now — is scheduled to be about 154,000,000 kilowatts ,an increase of 33 per cent over 1955.

Peak load for the country as a whole in December, 1955, was about 98,000,000 kilowatts, an increase of 14.4 per cent over the 1954 nationwide peak load. The December 1959 peak load is forecast at 130.6 million kilowatts — an increase of 33 per cent.

For the country as a whole, gross margin (the difference between maximum generating capability and peak demand) was 18.6 per cent in December, 1955. In the years through 1959 it is expected to vary between 16 and 19 per cent.

As to future construction of generating facilities, new power projects now scheduled for service in 1956 and later total 36 million kilowatts.

Home lighting month planned by AHLI

A FOUR-MONTH campaign to organize the cooperation of more than 2,000 electrical distributors and 300 electric utilities for American Home Lighting Fixture Month in October has been launched.

The full program was revealed by the American Home Lighting Institute during the annual convention of the National Association of Electrical Distributors in Atlantic City, where the Institute held its annual meeting in June.

"Our aim is to make October the start of the greatest sales year the residential lighting fixture industry has yet seen," explained Ted Cox, the Institute's managing director.

He said that an eight-page booklet, "Here's How," is already on its way to every electrical distributor and utility in the nation, explaining the potential of the October promotion and urging their support.

Included in the booklet is an invitation for distributors to participate in joint manufacturer-distrib-

Dates Ahead

Public Utilities Assn. of the Virginias, 38th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 14-15, 1956.

Maryland Utilities Assn., 32nd Fall Conference, Cavalier Hotel, Virginia Beach, Va., Sept. 14-15, 1956.

Southeastern Electric Exchange, Engineering & Operation Section Conference, John Marshall Hotel, Richmond, Va., Sept. 20, 21, 1956.

National Electrical Contractors Assn., Annual Convention and 2nd National Exposition, Sheraton - Palace Hotel, San Francisco, Calif., Sept. 23-29, 1956.

American Institute of Electrical Engineers, Fall General Meeting, Morrison Hotel, Chicago, Ill., Oct. 1-5, 1956.

Southeastern Electric Exchange, Sales Section Annual Conference, Tides Hotel, St. Petersburg, Fla., Oct. 3-5, 1956.

Southeastern Electric Exchange, Accounting Section Conference, Miami Beach, Fla., Oct. 11-12, 1956.

International Association of Electrical Inspectors, Southern Section, Annual Meeting, Statler Hilton Hotel, Dallas, Tex., October 22-24, 1956.

Florida Association of Electrical Contractors, Annual Convention and Electrical Exhibits, Balmoral Hotel, Miami Beach, Fla., Oct. 24-27, 1956.

American Institute of Electrical Engineers, Winter Meeting, Hotel Statler, New York, N. Y., Jan. 21-25, 1957.

National Association of Purchasing Agents, Public Utility Buyers' Group, 26th Annual Mid-Winter Conference, Brown Hotel, Louisville, Ky., Feb. 3-5, 1957.

Southeastern Electric Exchange, 24th Annual Conference, Boca Raton Hotel & Club, Boca Raton, Fla., April 1-3, 1957.

utor advertising and for both distributors and utilities to order and use AHLI's Otober Merchandising Kit.

More than 200 distributors are expected to join with the AHLI's manufacturer members in sponsoring a double-page color spread in the October "Living For Young Homemakers."

"The ad will spell out for consumers the advantages of modernizing with fixture light, and will refer them directly to the showrooms of distributors participating in the advertisement," Cox said.

A complete merchandising and promotion program, with materials to carry it out, is contained in the AHLI Merchandising Kit, to be sold at cost for $10.

Included are two-color posters and streamers for window and showroom display, newspaper ads, radio spot scripts, sample letters to contractors and builders, and publicity ideas for featuring fixtures in newspapers and on radio and TV.

"One of the most important elements of the kit will be a Showroom Guide, the first ever assembled, to tell distributors and utilities how to design showrooms and fixture displays," Cox explained.

The "Here's How" booklet will also be included with the kit to guide distributors and utilities in planning their activities. The booklet describes the potential of the fixture market, tells how distributors and utilities can work together, and lists specific advertising, publicity, and promotion projects which can be undertaken.

Brochure promotes engineering careers

"FOR A YOUNG MAN considering the choice of a career or profession, I can think of no more rewarding field than engineering . . . I know of no other industry which holds out so rich a promise of reward in service and achievement as does the electric industry." Harllee Branch Jr., president of Georgia Power Company and EEI, writes this appraisal of the electric power industry in the lead editorial appearing in a special issue of The Line, published by Line Material Company.

The issue, entitled "Your Engineering Opportunities in the Electric Power Industry," is a 24-page brochure being sent this week by L-M to utilities throughout the country for distribution to high school and college students. Regular subscribers will also receive copies.

The Line is a 24-page, two-color, bi-monthly publication containing articles of technical interest. It is distributed to about 27,000 utility executives and engineering personnel, as well as to engineering educators. This special issue, multi-colored to make an attractive presentation for students, has been offered to all utilities. One hundred copies imprinted with a utility's name have been made available at no charge, whereas quantities above 100 have been of-

fered at cost. Response from the industry has been enthusiastic with some utilities ordering 1,000 copies or more. The first printing of "Opportunities" is expected to run close to 100,000 copies.

R. G. Wheaton, president of Line Material, explains in his editorial, "This issue presents the story of the electric power industry. It is a story of engineering opportunities, challenge, dedication, and service. It is a story urging high school students to ask, 'Should I become an engineer?' and inviting college engineering students to look to the electric power industry for a career."

Articles that follow the editorials by Mr. Branch and Mr. Wheaton stress the theme of the issue. Engineering opportunities and the importance of electric utilities in the national economy, in the home, in national defense, in research, and in maintaining service continuity — all are covered. Proof of the theme is provided by the success stories of 15 representative utility engineers.

FAEC chapters employ managers

EIGHT CHAPTERS of the Florida Association of Electrical Contractors have recently employed chapter managers to conduct the business affairs of the chapters.

The St. Petersburg Chapter was the first FAEC chapter to employ a manager. Prior to his resignation recently, Thomas V. Ward held the job for almost three years. New St. Petersburg manager is A. I. Brannan, 655 Lake Maggiori Blvd., St. Petersburg.

Other chapters and their new managers are Jacksonville: W. S. Binckley, P. O. Box 3172, Jacksonville; Broward County: W. S. Stewart, 404 N. Andrews Ave., Ft. Lauderdale; Central Florida: Stanley Nowak, P. O. Box 6007, Orlando; Miami-Dade County: Charles Powers, 2526 W. Flagler St., Miami; Manatee-Sarasota County Chapter and Tampa Chapter: Joint Manager L. E. Roark, P. O. Box 1671, Sarasota; and Polk County: Walter N. Emerson, P. O. Box 267, Lakeland.

G-E package unit for outdoor lighting sales

A COMPLETE merchandising kit designed to help electric utility companies tap the tremendous potential outdoor residential lighting market has been announced by General Electric's Lamp Division, Nela Park, Cleveland, Ohio.

As part of its "Light for Living-Outdoors" program, G-E is offering utility companies a comprehensive sales aid package that includes educational information, promotional material, and display and sales aids. Material in the kit has been tailored to reach and include every segment of the lighting trade which is interested in more and better outdoor lighting.

G-E points out that the growing trend toward outdoor living brought on by the tremendous migration to the suburbs has created a whole new market for outdoor lighting fixtures and equipment. It is offering the sales kit to utilities as a help towards reaping the benefits of this "plus load."

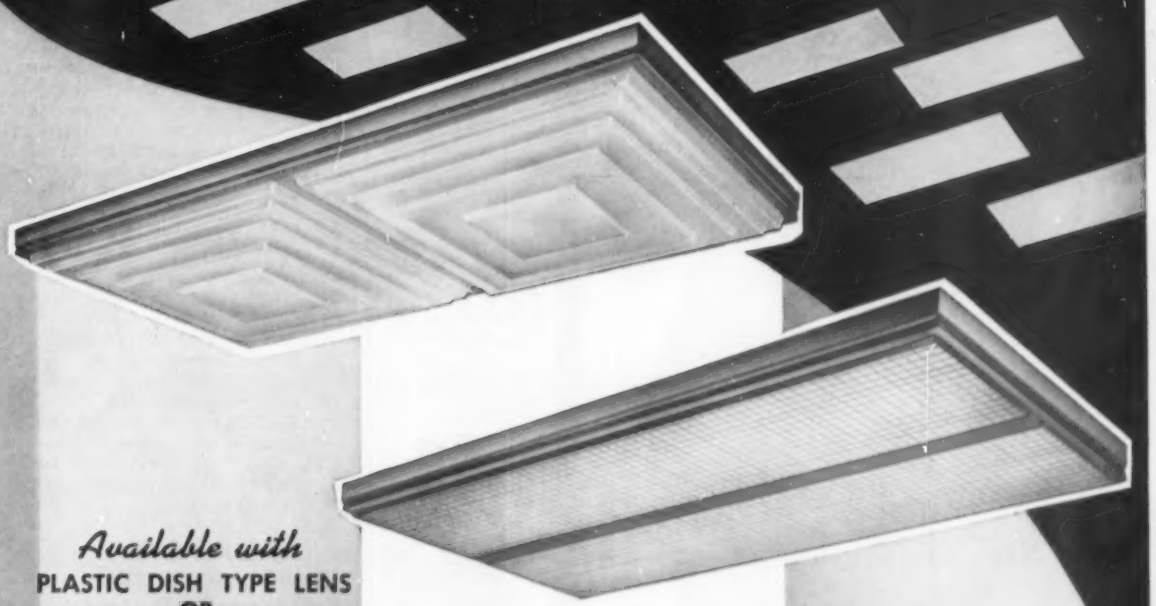
Promoting "Light for Living-Outdoors" is another way of helping fill in the "valleys" between other daily and seasonal consumer demands for power, according to the introduction used in the kit.

It is suggested that electric utilities can encourage the growing trend toward lighting up yards and gardens by forming a team composed of all segments of the electrical industry in their areas. A coordinated drive, according to G-E, can produce sales results satisfactory to all components. This statement is based on test programs conducted last year with several selected utilities. The bulk of the material included in the package has been developed as a result of this pre-testing.

For maximum results in probing the outdoor lighting market, it is recommended that a team be formed under the leadership of the utility. Included on this team should be electrical distributors,

Eastern RECTILINEAR ILLUMINATION

GIVES TROFFER APPEARANCE —
TROFFER LIGHTING PATTERNS —
without
TROFFER EXPENSE



Available with
PLASTIC DISH TYPE LENS
OR
PLASTIC LOUVER
WITH

2 or 4 40-Watt T12 Rapid Start Lamps
or
4 20-Watt T12 Trigger Start Lamps

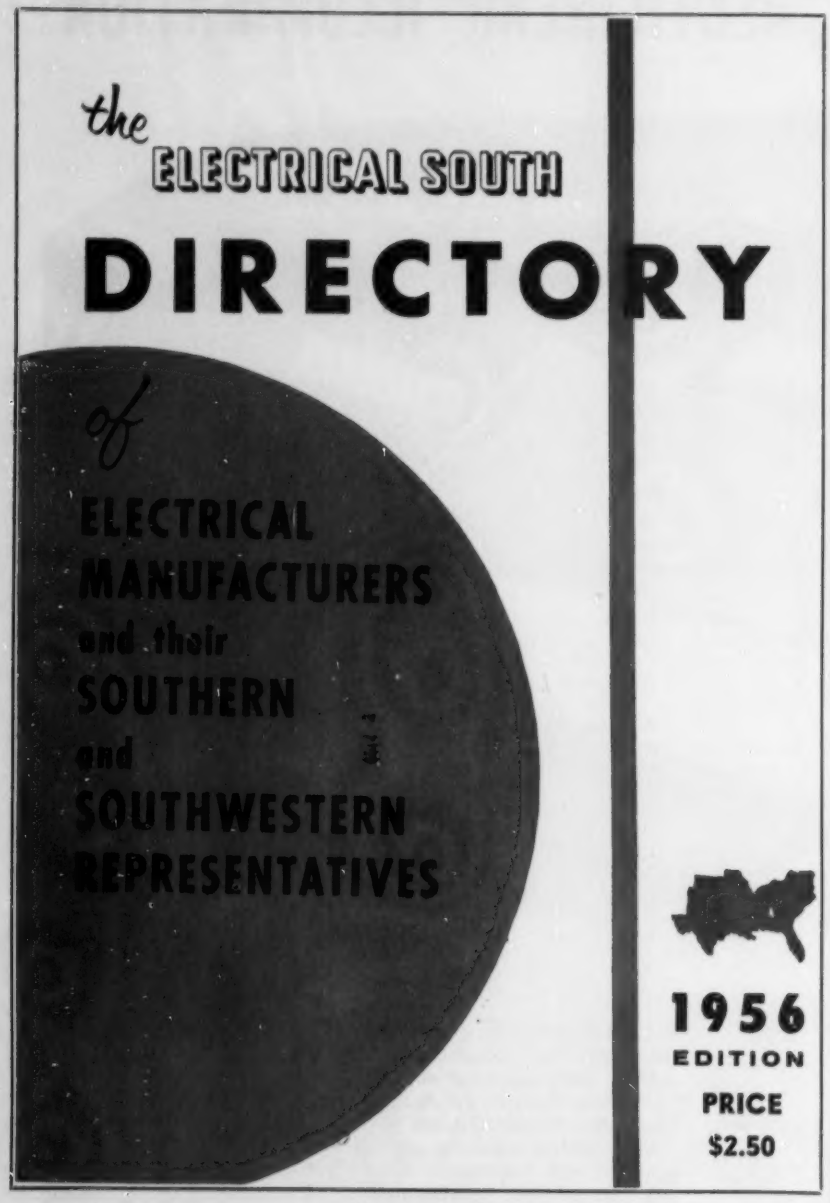
These 2 Eastern units unquestionably represent the year's first advancement in commercial lighting. Here you have abundant, glare-free illumination from a unit that is less than 3" deep. In addition, virtually every geometric lighting pattern known to engineering can be achieved with these units, yet the cost is far less than a troffer installation.

Before you buy lighting, be sure to get the facts about Eastern's Rectilinear Illumination — you'll be glad you did.

Eastern ENGINEERED

EASTERN FIXTURE COMPANY
170 VERNON STREET, BOSTON 20, MASSACHUSETTS

THIS IS BRAND NEW!



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nurserymen, lamp retailers, garden supply stores, furniture and department stores, electrical and hardware dealers, fixture manufacturers, landscape architects, and contractors and builders. All of these have an interest in the outdoor lighting boom and can, by concerted effort, help develop it to its fullest potential.

As pointed out in the kit, new home construction and remodeling continue at near-record peaks, and whether they are building or remodeling, homeowners are including outdoor lighting in their plans.

To help the utility develop the outdoor market, G-E has included in its kit the following aids:

Lighting Engineer's Handbook—prepared for the lighting designer; Creating Your Own Vistas—a detailed case study of a lighting design; Outdoor Wiring Handbook—a complete guide for outdoor wiring equipment and materials and how to use them; outdoor equipment manufacturer's catalog—lists over 40 producers of residential lighting equipment; sound-slide film—in 35 mm. A 17-minute full color "deluxe" presentation of the outdoor lighting story for consumers; slide talks with script; TV film commercials; and an outdoor lighting recipe booklet — a companion piece to G-E's well received recipe booklet for home lighting.

In addition, the kit includes publicity releases the utility can use to stimulate consumer interest, reprints of G-E trade and consumer magazine ads, sample radio and TV spot announcements, newspaper ad mats, and a packet of point-of-sale material.

Brief news notes of manufacturers

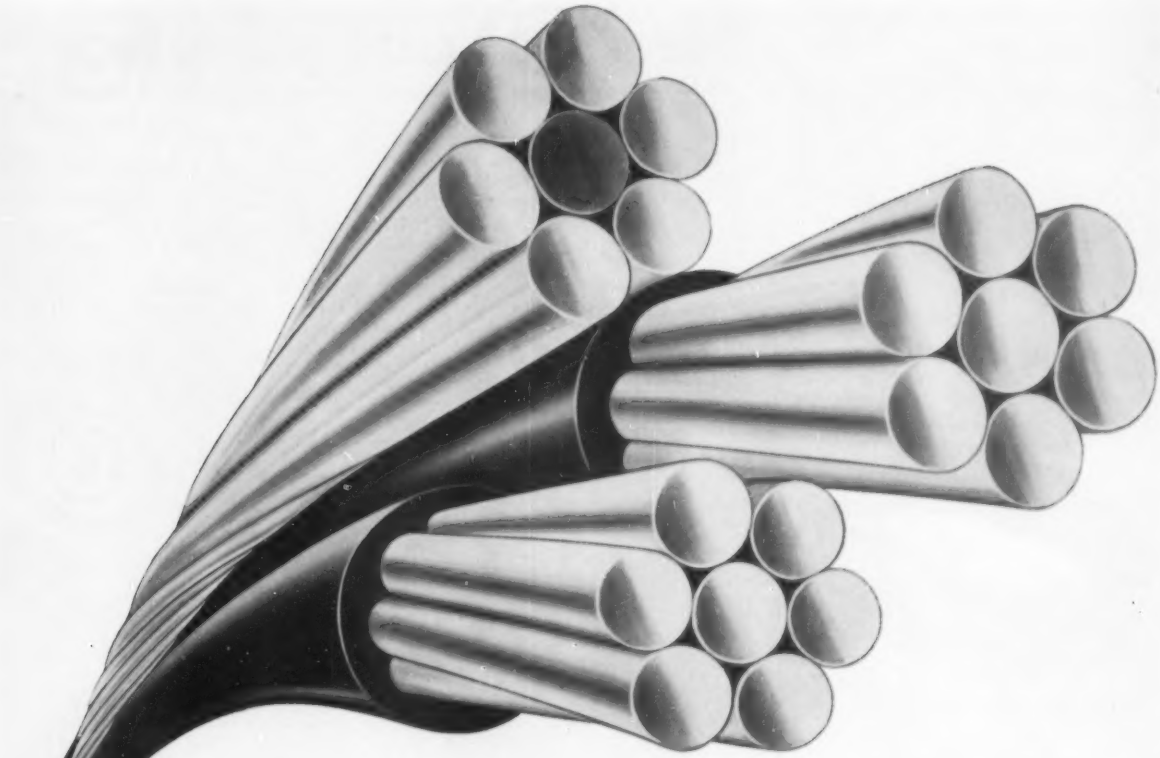
THE FORMER Locke Department will soon become the Insulator Department of General Electric. In making this announcement, P. R. Hartig, general manager, stated, "We believe that this new name better expresses the nature of the department's service to the electric power industry."

Future communications will bear General Electric Company's corporate signature in order to identify the department more closely with the company's resources. The trade name Locke will only be used with insulators and catalog numbers.

* * *

THE ESTABLISHMENT of a Southern Division located in Hileah, Fla., has been announced by Lite-Mor Electrical Manufacturing Corp., P. O. Box 10808, Pittsburgh 36, Pa.

New treasurer of the firm is David E. Taub. His son, Buddy Taub, is president of Lite-Mor.



Save up to 30% on service drop installations with

Rome Aluminum Triplex

You save as much as 30% on initial cost and installation expense by specifying Rome Aluminum Triplex in place of conventional Type SD service drop cable.

You cut maintenance costs and service interruptions, too. The triplex construction gives your installations high resistance to storm damage, wind and ice loading.

You get full protection against effects of sunlight, heat, moisture, corrosive atmospheres and other hazards from the rugged RoPrene (Neoprene) or RoLene (polyethylene) insulations which are standard on Rome Aluminum Triplex. Rome Triplex Conductors can be supplied with an inner layer of high-quality rubber insulation, covered with a durable, tough RoPrene (Neoprene) sheath, when specified.

And you get a cable that's "public relations minded," because triplex installations are neat—no cluttered unsightly open wires, no braids to rot and festoon. Full information is yours for the asking. Write today for Bulletin RS-5.

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Rome Cable Corporation, Rome, N. Y., and Torrance, Calif.

PREVENT
Short Circuits
AND
Costly Grounds
WITH
UNION
INSULATING CONDUIT
BUSHINGS
The Complete Line

No. 24 Series

MOLDED NON-METALLIC
(Be sure you see the canvas.)

No. 96 Series

Insulated Metallic Grounding
(Lugs take wide range of wire sizes.)

No. 97 Series

INSULATED METALLIC
(Completes the line.)

UNION INSULATING CO.
PARKERSBURG, WEST VIRGINIA

News about people

Ralph H. Teed has been named executive vice-president of **Arkansas Power & Light Company,** president R. E. Ritchie has announced. Mr. Teed has been a vice-president since 1951 and is a veteran of 35 years in the electric utility.

Mr. Teed began as an engineer for Federal Light & Traction Company of New York in 1921. Two years later he transferred to Trinidad Electric Transmission Railroad Co., at

Ralph H. Teed

Trinidad, Colo., and later became construction engineer for New Mexico Power Co.

In 1928 he became president of Citizens Electric Company at Hot Springs. He became Western Division manager for AP&L when the power company assumed operation of the Citizens Electric properties at Hot Springs in 1943.

Mr. Teed is a member of American Society of Mechanical Engineers and holds a mechanical engineering degree from Cornell University, Ithaca, N. Y.

R. R. Pittman, Little Rock, chief engineer of **Arkansas Power & Light Co.,** has been elected a vice-president

R. R. Pittman

of the company by the AP&L board of directors.

The action was taken by the board following the annual meeting of AP&L stockholders at which the electric company's directors were re-elected for another year. AP&L directors also re-elected all other officers.

On June 1, Mr. Pittman completed 37 years with Arkansas Power & Light Co. He joined the company as an electrical engineer at Pine Bluff in 1919. Since that time he has been one of the chief planners and designers of the integrated transmission and distribution system now carrying electric service into 61 counties. Mr. Pittman is known throughout the electric industry for designing the single pole type of rural line that helped speed rural electrification throughout America.

R. L. Harris, manager of electric operations for **Alabama Power Co.,** has been elected a vice-president by the company's board of directors. A native of Clanton, he has been with Alabama Power since his graduation from the University of Alabama in 1923. He became manager of production in 1951 and manager of operations in 1954.

William H. Sadler, commercial sales engineer for **Georgia Power and Light Co.,** at Valdosta, Ga., has been promoted to assistant director of residential development for the entire Georgia Power and Light Company —Florida Power Corporation system, with headquarters at St. Petersburg, Fla., John W. Lastinger, president of Georgia Power and Light Co., has announced. Mr. Sadler has been replaced in Valdosta as commercial sales engineer by **Lowry B. Miller,** who transferred from Deland, Fla.

A veteran of 20 years service with the company, Mr. Sadler has served the utility as local manager and in sales positions. In his new job he will assist C. W. Ailstock, director of residential development, in formulating company sales policies and in directing activities of some 40 residential sales representatives and home service advisors.

He is a native of Birmingham, Ala., and veteran of Naval service during World War II. Since coming to Valdosta in 1945, he has been active in professional and civic projects, and was just recently elected vice-chairman of the Illuminating Engineering Society's local chapter.

Mr. Miller is a native of Washington, D. C., and has been with the company for two years as commer-

first...
and still the finest

SPLIT BOLT CONNECTORS

KEARNEY CON-NEC-TITES

Since the first split bolt connector was introduced by KEARNEY in 1926, it has had many imitations. But the famous Con-Nec-Tite has never been equalled because KEARNEY has constantly kept making it better. New materials and new design features have made it stronger and more versatile.

Today's all-purpose Con-Nec-Tite is fully plated. It can be used interchangeably for aluminum to aluminum, aluminum to copper or copper to copper connections.

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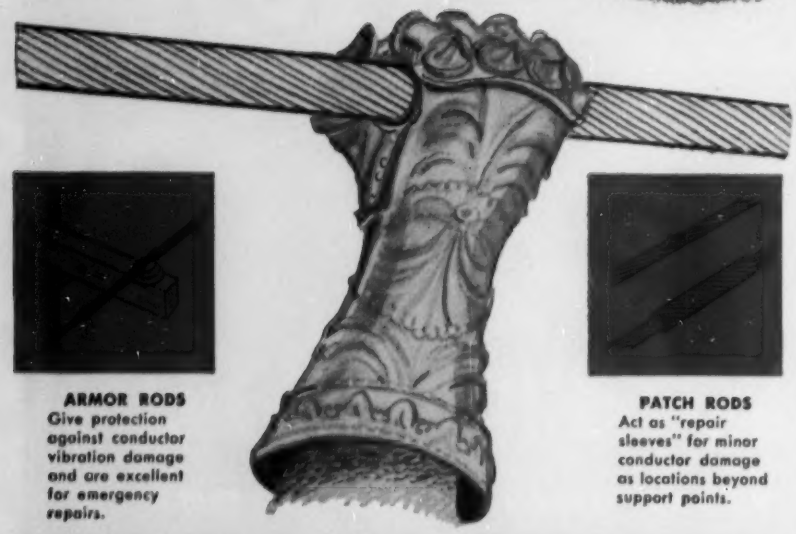
for BETTER CONSTRUCTION
SAFER MAINTENANCE
Specify
JAMES R. KEARNEY
The Mark of Quality
KEARNEY PRODUCTS

WHEREVER Protection IS NEEDED ON OVERHEAD CONDUCTOR LINES

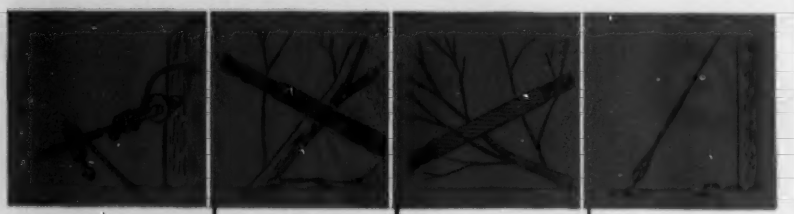
fine FANNER Superformed PRODUCTS

provide it better...easier...at substantial savings



ARMOR RODS
Give protection against conductor vibration damage and are excellent for emergency repairs.

PATCH RODS
Act as "repair sleeves" for minor conductor damage at locations beyond support points.



TAP ARMOR
Protective layer of shortened rods facilitate making taps without risking conductor damage.

PLASTIC FANNGUARDS
Tough, durable plastic sleeves used on covered wires for protection against tree abrasion.

ALUMINUM LINEGUARDS
Made to protect triplex cable or bare conductors against abrasion electrical damage.

FANNGRIPS
For a permanently positive grip on guy strand with maximum economy in material and labor.

Whenever you need accessory items for overhead distribution and transmission lines, you'll do far better by standardizing on Fine FANNER Superformed PRODUCTS. Each product in the FANNER Superformed line is precision manufactured to install easier and faster on the job. Careful packing insures safe delivery and simplified storage. Highest quality materials provide long life regardless of the type of installation. With all their extra features, FANNER Superformed PRODUCTS cost no more than ordinary products. For full information on the Fine FANNER Superformed Line, write for literature and prices today!

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Electrical Products Division
Brookside Park Established 1894 Cleveland 9, Ohio

AGENTS AND DISTRIBUTORS IN PRINCIPAL CITIES

cial sales engineer in Deland, Fla. He attended Purdue University and served in the Coast Guard in 1934-46.

Hoyt A. Wiggins has been named assistant division superintendent of **Georgia Power Company's** Atlanta division. He succeeds **D. O. Smith,** who has been transferred to other duties because of ill health. **Paul B. Boyd** succeeds Mr. Wiggins as assistant superintendent of distribution.

Mr. Wiggins joined Georgia Power as a junior engineer in 1928 and worked as district engineer at Carrollton and as division engineer in Athens. He has been assistant superintendent of distribution in the general office, Atlanta, since 1942.

Mr. Smith has been with the company for more than 30 years, beginning in 1925 as a tester. He has been assistant division superintendent since 1937.

Mr. Boyd joined the engineering department in 1928. He was named senior underground engineer in 1946 and transferred to the operating department in 1955.

R. Roy Dunn, president, **Potomac Electric Power Co.,** has announced the appointment of **Dorsey F. Hughes** as electrical engineer. Mr. Hughes succeeds **Lucius E. Steere, Jr.** who retired, and will assume responsibility for the administration of the electrical engineering and system planning activities of the company.

Mr. Hughes, a native of Washington, D. C., is a graduate of Union College where he received his B.S. in Electrical Engineering in 1934. He began his employment at Pepco in July 1934. All of his service has been in the Distribution Engineering Division of the company, with the exception of a short period of time which he served as assistant to manager, Electric System.

Ralston B. Reid of Schenectady, N. Y., General Electric Company advertising executive, has been elected chairman of the board of the **National Industrial Advertisers' Association,** at its 34th annual conference in Chicago.

He succeeded **David F. Beard,** director of advertising, Reynolds Metals Co., Louisville, Ky.

Other officers elected are Richard C. Sickler, E. I. DuPont de Nemours and Co., Wilmington, Del., vice-chairman of the board; George A. Frye, vice-president, Doyle, Kitchen and McCormick, Inc., New York, N. Y., secretary treasurer; William Farrell, Monsanto Chemical Co., St. Louis, Mo., vice-president; G. R. Holtz, Farr Co., Los Angeles, Calif., vice-president; E. H. Woodley, Northern Electric Co., Ltd., Montreal, Canada, vice-president;

Mitchell Tucker, Oil and Gas Journal, Tulsa, Okla., associated director; and C. W. Tunison, Foy Paint Co., Cincinnati, Ohio, director-at-large.

Mr. Reid is manager of advertising and sales promotion for the General Electric Company's Apparatus Sales Division, Schenectady, N. Y., having been appointed to that position December 1, 1953.

Wagner Electric Corp., St. Louis, announces the consolidation of all its electrical and automotive engineering and research facilities under the direction of **P. C. Ford**, newly appointed executive engineer. Mr. Ford was formerly chief engineer, Electrical Division.

P. C. Ford

Under the new organization, **C. E. Widell** was appointed director of Research and Development. Prior to this appointment, Mr. Widell had been on special assignment with the Engineering and Research Departments. **P. J. Reese** was made assistant director of Research and Development. Mr. Reese has been employed by the Wagner Corporation since 1929 and prior to his present assignment was manager of Development and Application Engineering, Automotive Division.

C. E. Widell

In the Electrical Division, two chief product engineers were named: **H. B. Keath**, Transformers, and **A. E. Frohardt**, Motors. Both men are graduate electrical engineers and have had many years of experience in their respective departments.

E. E. Wallace was named chief product engineer, Automotive and Industrial Brake Products. Mr. Wallace has been in the automotive engineering department at Wagner since 1941, with the exception of time spent in the Armed Forces during World War II.

J. T. Hepp was named manager of the Patent, Metallurgical and Chemical Division. **W. R. Freeman**, who was chief automotive engineer, has been made consulting engineer on automotive product design and research and development.

In announcing the consolidation and appointments, G. W. Brown, vice-president in charge of Engineering and Manufacturing, pointed out that integration of the various divisions will enable the company to place added emphasis on product design, research and development to meet the expanding market demands of the future.

Century Electric Co., St. Louis, has announced that **John B. Heil**, application engineer of the company's Atlanta office, has been assigned to the post of acting district manager at Birmingham.

Technical books

for the electrical man

Air Conditioning and Engineering

Second Edition, published by American Blower Corp., Detroit, Mich., 260 pages, illustrated, $6.00

This volume, prepared by air engineering specialists, is a study of the techniques of conditioning and mechanical movement of air and the transmission of power for health, comfort, and efficiency of production.

The science of air engineering is becoming increasingly important today. A growing population and a more complex industry are calling upon this science for the solution of accumulating problems. The need for adequate ventilation and heating has led to the demand for complete conditioning of air to provide the proper temperature, humidity, and circulation required for human comfort wherever people congregate.

Through research, industry has developed more efficient methods and apparatus for drying, vapor absorption, mechanical draft, power transmission, dust and fume removal, pneumatic conveying, and innumerable special applications.

This volume contains fundamental principles, laws, and tables, determined experimentally or mathematically; sample calculations in considerable detail; and a compilation of data based on the experience of the authors, their predecessors, and contemporary engineers throughout the country.

Subjects discussed under separate section headings include air conditioning and refrigeration, heating and ventilation, industrial processes, mechanical draft, dust collection and control, and fluid drive power transmission. A special section is devoted to tables and charts.

The material is treated in a practical manner so that readers will find the data useful in the solution of air engineering and power transmission problems.

Copper Wire Tables

Published by National Bureau of Standards, Circular 31, 4th Edition, 19 tables, $.30

These tables are of special importance to workers in the copper industry, electrical engineering, and related fields concerned with the distribution of electrical power. Copper wiring is used almost universally for such distribution.

The first edition of this circular was prepared in 1912 at the request of the Standards Committee of the American Institute of Electrical Engineers. It was an attempt to standardize the characteristics of a number of different wire gages in use at that time.

All data in Copper Wire Tables is expressed in both English and metric units. The American Wire Gage as presented in this publication is formed by geometrical progression. The circular also contains a number of very simple formulas for computing data for any size wire.

This edition represents the third revision for Circular 31. In the new revision the tables have been extended to 50 gage and up to 200°C to make them more useful to the present demands of science and industry.

Copies may be obtained by writing U. S. Government Printing Office, Washington 25, D. C.

Large-Scale Transformer at Allis-Chalmers

Plenty of room for expansion at the Gadsden, Alabama facilities.

INCREASED production of pole-type distribution transformers at Allis-Chalmers Gadsden (Ala.) Works is good news to southern electric utilities. Now, this new plant puts every transformer user in the Southeast and Southwest within close shipping distance. By keeping Allis-Chalmers warehouses well stocked, Gadsden Works helps shorten supply lines to speed deliveries.

Allis-Chalmers Gadsden and Pittsburgh Works are teamed together to meet the increasing demand for quality controlled distribution transformers.

A-C Expansion Elsewhere

In addition to the new operations at Gadsden, Allis-Chalmers is now increasing facilities for the manufacture of electrical equipment in Pittsburgh, Boston, Terre Haute and Milwaukee.

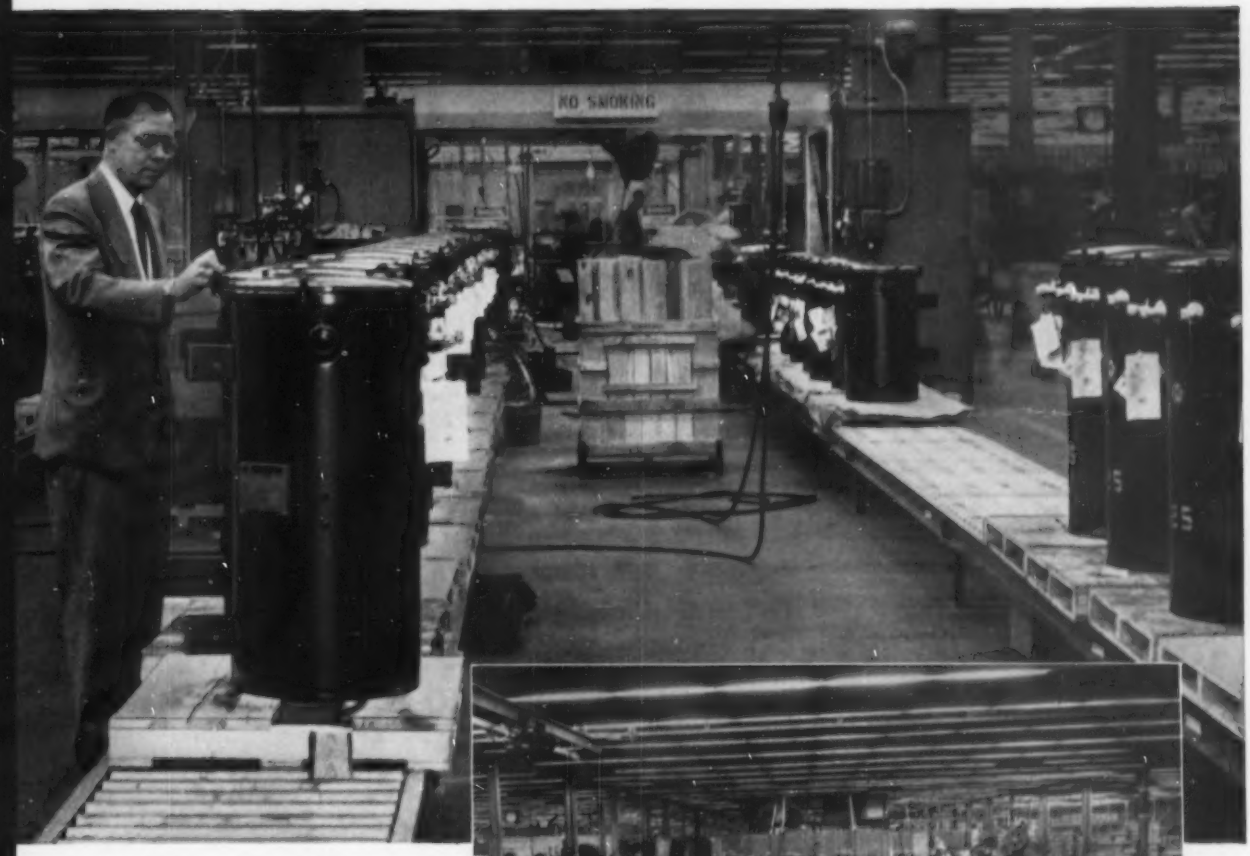
A-C ALLIS-CHALMERS

A-5100

ALLIS-

Production in Operation
Gadsden (Ala.) Works

New Facilities Supplement Pittsburgh Works in Manufacture of Pole-Type Distribution Transformers



W. Damkoehler, Gadsden works manager, looks over distribution transformer ready for crating.

Core and coil assembly area for distribution transformers.

CHALMERS

GADSDEN WORKS
Gadsden, Alabama

Free bulletins

available to our readers

A new 12-page booklet will help in choosing the type of **electrical tape** best for every insulating and protecting application in electrical construction, maintenance and manufacturing. The folder, "Tool Up With Tape—Big Four Electrical Tapes," is published by the **Dutch Brand Division** of Johns-Manville, 7800 S. Woodlawn Ave., Chicago 19, Ill.

The booklet is complete with illustrations, technical data, characteristics and performance specifications for plastic, friction, rubber, and vinyl color electrical tapes.

A comprehensive 552-page hardcover catalog listing a complete line of **electrical materials and apparatus** has been published by the **Englewood Electrical Supply Co.**, of Chicago and Rockford, Ill., and South Bend and Gary, Ind.

Ease of use of this comprehensive catalog has been assured by a detailed indexing of items, and by combining of these items into 22 major sections according to type of equipment or materials.

Catalog 65 has been printed in accordance with the NAED's Standard Reference Catalog Plan by **The Jaqua Co.**, Grand Rapids 2, Mich., who operate the plan for the **National Association of Electrical Distributors.** This plan permits Jaqua to have type pre-set and engravings on file for products of all major manufacturers of electrical equipment. This assures standardized listings at minimum cost in preparation of distributor's literature.

A new booklet, **Better Industrial Lighting with Mercury Vapor,** has been announced by **Sylvania Electric Products Inc.**

The purpose of the booklet is to point out to the plant manager or engineer how he can improve industrial seeing and working conditions at lower cost. The manual contains a summary of eight basic advantages of using mercury vapor lamps in industrial plants.

The new booklet contains ten photographs showing typical applications of mercury vapor lamps, and a section on engineering hints for effective installations. It discusses the proper use of high bay reflectors and tells various ways to meet color requirements. The manual also contains information on how to combine mercury vapor lamps with fluorescent or incandescent lighting. The new booklet is available without charge from Sylvania sales offices.

Kuhlman's completely revised, eight-page product bulletin, CS-201, on **conventional distribution transformers**—167 KVA and below—is now available from **Kuhlman Electric Co.,** Bay City, Mich.

This new bulletin includes generous cut-away views of Kuhlman transformer construction, thorough descriptions on product features, manufacturing processes, and quality control procedures. Special emphasis is given to core and coil construction with illustrated explanations on materials, design, and processing methods used for each component. A full back page cut-away diagram summarizes coil engineering features for quick reference.

Enclosed **capacitor equipments** for high voltage installations are described in **General Electric's** new bulletin, GEA-2860D.

The 12-page, two-color booklet covers the application of ready-assembled equipments ranging from 600 to 5,400 kvar, 2,400 volts and above, to reduce voltage drop and cut power losses.

Copies may be obtained from any G-E district office, or from the company, 1 River Rd., Schenectady 5, N. Y.

The handy-size, 132-page **Mid-Summer Motor Book** is now available from **W. W. Grainger, Inc.,** 118 S. Oakley Blvd., Chicago 12, Ill. Listing over 2500 electrical items, this Grainger catalog features current and potential best sellers.

New items listed include two fan models plus a power-plant unit and several new tool items.

Three new adaptations of **Allis-Chalmers** line of **low voltage air circuit breakers** rated at 40 to 600 amperes, 25,000 ampere interrupting capacity at 600 volts a-c (LA-25), and 200 to 1600 amperes, 50,000 ampere interrupting capacity at 600 volts, a-c (LA-50) have been announced by the company.

These adaptations are pull-out type individual enclosures for wall mounting, separate breakers for frame or panel mounting, and skeleton enclosures for use by switchboard builders.

In the wall mounted breaker, removal of a deep front cover exposes the entire breaker for inspection and maintenance. This breaker can be removed without disturbing cable connections and the enclosure has ample work space. The cover is interlocked so that it cannot be removed without tripping the breaker. The equipment is available in general purpose, dustproof and weatherproof models.

A newly published **Redmond** "Standard Line" MicroMotors catalog lists the uses and performances of the complete line of Redmond **fractional horsepower electric MicroMotors,** blowers, and fan blades, plus full information on Redmond replacement kits and accessories.

Included in the new catalog are pictures and data on Redmond Types L and BL MicroMotors for low-powered applications; the heavy duty W motors; and the extra heavy duty AY-BY motors.

Free copies of this Redmond "Standard Line" MicroMotors catalog may be obtained by writing Redmond Distributors, Inc., 201 Monroe Street, Owosso, Michigan.

Two new booklets, showing different ways in which the Ramset **fastening tool** can be used, are being offered free of charge by **Ramset Fastening System,** Olin Mathieson Chemical Corp., 12117 Berea Rd., Cleveland, Ohio.

One booklet shows how Ramset can be used for plant maintenance. It discusses the fastening of such things as conduits, buss ducts, junction and outlet boxes, surface raceways, fixtures and frames, duct straps, fan and blower mounts, sprinkler pipes, wood partition plates, and moveable partition plates.

The second booklet tells how Ramset can be used for lead lining. It tells how to line heavy wall steel tanks, thin wall steel tanks, wood tanks, concrete tanks, and X-Ray laboratories and storage rooms. It also discusses general applications of lead lining.

A new, informative 32-page bulletin providing design and product data on single- and three-phase **distribution transformers,** with high-voltage ratings from 480 to 15,000 volts, has been published by the Gardner Transformer Division, **Federal Pacific Electric Co.,** Emeryville 8, Calif.

Transformers featured in the bulletin utilize special silicon steel cores in which loss is decreased and permeability is increased by controlled cold-rolling and annealing of laminate material. The oriented core material contributes to light-weight designs that require less copper, oil and smaller tanks. From an operational viewpoint, electrical regulation is improved and maintenance is reduced.

Use of inhibited oil is described as a safety factor and a feature that re-

Familiar symbols of safety

PROTECTION ON THE RAILS
FOR YOUR
WIRING PROTECTION
Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.
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SERVICE

Permanently safe wiring systems today demand the use of Youngstown Buckeye full-weight rigid steel conduit for positive protection from damaging elements such as water, moisture, vapor, dust and dirt. It's been the accepted standard of architects, contractors and owners who have found over the years its higher quality and longer service life spell increased profits and less trouble on-the-job.

Users across the nation consistently report Buckeye Conduit is easy to fabricate—easy to fish wires through—and guarantees trouble-free installations because of its excellent corrosion resistance.

Leading distributors in every industrial and electrical market are ready to serve you quickly from their ample stocks. They're as near as your phone—why not call now?

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Here's a new twist

Why bother with lighting fixtures that are complicated to install and bothersome to maintain? When a lighting job calls for an incandescent fixture . . . use the Westinghouse Locklite®. A quick twist and the reflector is disconnected from the hood, another twist and it is connected. Your electrical contractor can install the Locklite in a jiffy . . . your maintenance man can remove the dirty unit (without removing the lamp separately) and install a *clean one* in *one* trip.

Inspect the sturdy construction yourself . . . notice the all-white porcelain reflector, slotted to minimize collection of dirt . . . the straight-through wireway . . . all RLM approved. J-04398-A

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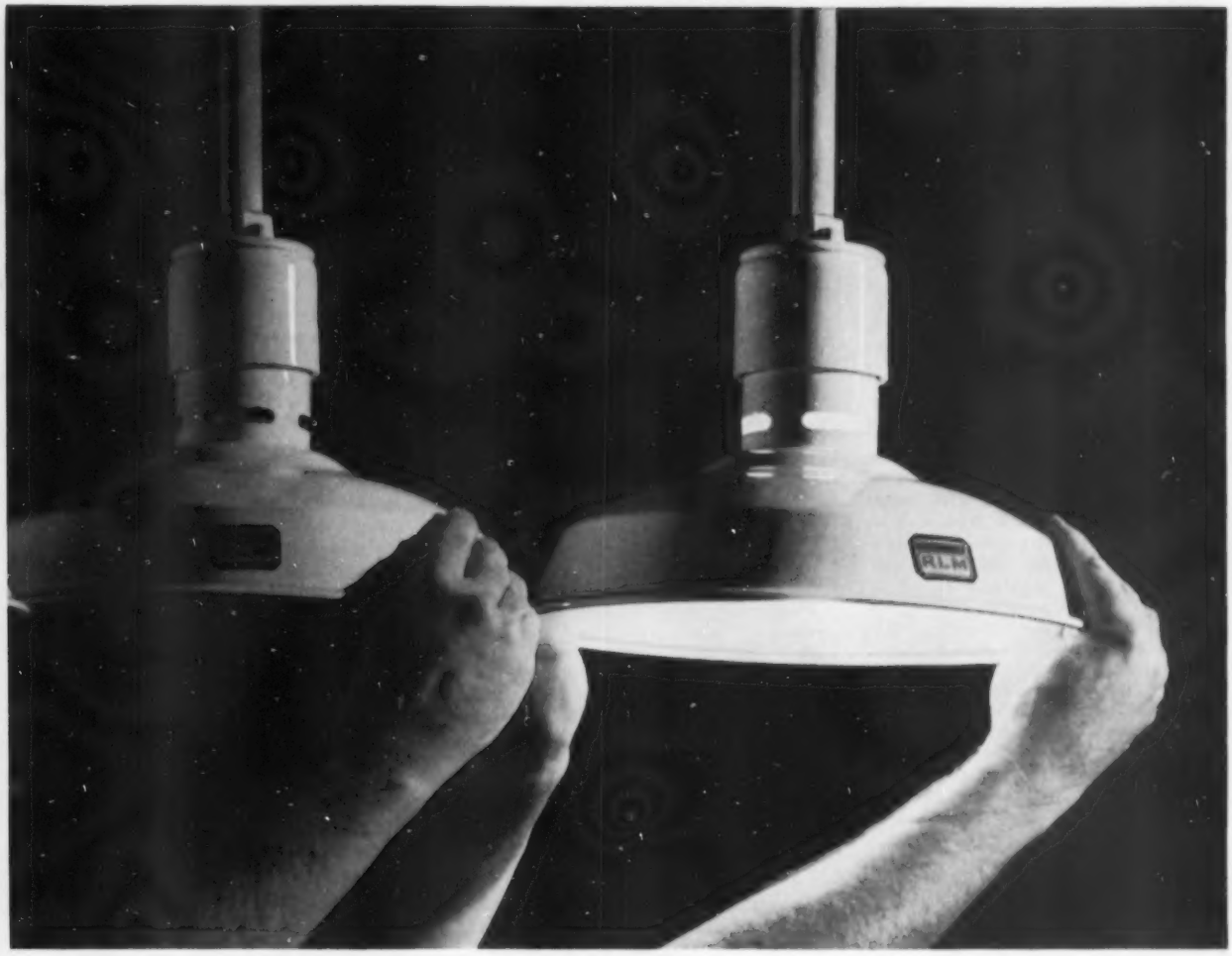
*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU***



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Westinghouse Electric Corp.
Lighting Division, Edgewater Park
Cleveland, Ohio

☐ Have a representative demonstrate the Locklite.

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duces premature failures, increases interval between inspections and extends transformer life due to ability to handle peak loads.

A new dual purpose condensed catalog No. CTC-1 and **contractor-dealer net price sheet** has just been issued by **Steber Manufacturing Co.**, Broadview, Ill.

All items in the Steber line of lighting equipment—floodlights, sealed beam lamp components, etc.—are illustrated and described. Net prices to contractor-dealers in standard packages and less than standard packages are included.

Catalog No. 853 describing and illustrating "Rakit" **supporting structures** for cable trough, instrument tubing trough, conduit, pipe, cables, etc., has been announced by **T. J. Cope, Inc.,** 711 South 50th St., Philadelphia 43, Pa.

"Rakit" is the Cope system of channel-shaped interlocking parts which, by inserting the ends together and giving a twist of the wrist, becomes a strong supporting structure for cable trough, conduit, pipe, and similar items. It is made of cold formed carbon steel of such proportions as to provide ample strength.

The various uses of "Rakit" are described and illustrated in the new seven-page catalog.

Complete technical and descriptive data on the Levolier line of **electrical specialties** are contained in a new 52-page catalog prepared by the **McGill Manufacturing Co., Inc.,** Valparaiso, Ind.

Ease of use has been assured by grouping the material under three major headings: switches, lampholders, and lamp guards. Items covered in this comprehensive catalog include switches of all types in ratings from 0.75 to 20 amps; brass and phenolic lampholders equipped with push-button or pull-chain switches; industrial lamp guards with phenolic, wood or rubber handles; service lights in a wide variety of styles in medium (50-watt bulb) and large (100-watt bulb) sizes; and miscellaneous parts and accessories.

The Application Engineering Department of **Holophane Company, Inc.,** 342 Madison Ave., New York, N. Y., offers a new 16-page booklet, **Color Corrected Mercury Vapor Lighting for Indoor Sports and Assembly Areas,** covering the results of an analysis of such lighting from the standpoint of players, spectators, choice of equipment, and selection of lamps. This information is supplemented by case history with illustrations of actual installations.

A new bulletin #356, called **Commercial Defrosting Time Switches,** has been prepared by the **Tork Clock Co., Inc.,** Mt. Vernon, N. Y., manufacturers of automatic control equipment. The detailed information in the bulletin makes it possible for refrigeration engineers and contractors to pin-point the exact type of switch needed for optimum defrost control with any commercial unit.

Time switches described are for use in economical hot gas, reverse cycle, and electric heat defrosting, as well as for time, pressure, and temperature control and compressor shutdown defrosting of one hour or longer. Specific details provided as to length of defrost, number of defrost cycles, and contact arrangements serve to make Tork bulletin #356 a working time switch manual for refrigeration engineers. Typical wiring diagrams will also be available in a supplementary bulletin #563.

Delta-Star Electric Division, H. K. Porter Company, Inc., 300 Park Ave., New York 22, N. Y., has just released a new six-page publication describing in detail their complete line of B-2K single-pole outdoor, hook operated **disconnecting switches.**

This easily read publication is fully illustrated to clearly explain the B-2K switch design, construction, and operation. Types for upright, vertical, and inverted mounting, with ratings from 7.2 to 115 kv; 400, 600, and 1200 amperes, are listed.

Complete tables give catalog numbers, nominal ratings, and dimensions as well as maximum design voltage, impulse withstand voltage, and momentary current ratings.

A new 1956-57 general catalog of **low-voltage electrical distribution equipment** and components has been announced by **General Electric's** Trumbull Components and Distribution Assemblies Departments, Plainville, Conn.

The 160-page, two-color publication provides a single, bound reference for the products manufactured by these two G-E departments and marketed through Assemblies & Components Sales organization. It is designed to provide engineers, contractors and purchasing agents with a reliable source of information for specifying electrical power distribution equipment and components for applications up to 600 volts.

Bulletin GEC-1005G, 60 pages, contains application index, calculating data, specifications, operating information, and list prices of standard **General Electric heaters and heating devices.**

Included are immersion, strip, cartridge, tubular, fin, and railroad switch heaters; unit heaters, soldering irons, glue pots, soft-metal melting pots, oven equipment, and control. Process and application index shows methods of heating and type of heater recommended for various heating processes. Write General Electric Co., Schenectady 5, N. Y.

A new 36-page catalog of electrical **service entrance equipment** has been announced by **General Electric's** Trumbull Components Department, Plainville, Conn.

Known as the 1956 Quick Guide and designated TCD-17, the new publication contains complete pricing information and detailed descriptions of General Electric's service entrance devices for homes, farms, commercial and light industrial installations. These products include circuit breaker load centers, all-in-one meter socket—load center combinations, fuse puller switches, residence fuse panels, meter service entrance switches and both standard duty and general use safety switches.

Bulletin GEA-6358, eight pages, gives new application information on **General Electric** CR 1061 and CR 1062 **manual starters** for fractional and integral horsepower motors to 7½ hp. The two-color publication includes enclosure and dimension data. Write General Electric Company, Schenectady 5, N. Y.

Transformers with "Chlorextol" fireproof insulating liquid for safe indoor installations are described in a new bulletin released by **Allis-Chalmers Manufacturing Co.**

The bulletin tells how the use of "Chlorextol" liquid-filled transformers reduces fire hazards and eliminates costly vaults. These transformers, depending upon application, are available in ratings from three through 15,000 kva, 46 kv and below.

Copies of the bulletin are available on request from the company, 938 S. 70th Street, Milwaukee, Wisc.

Eighty different devices are covered in a 40-page "testing-instruments reference book" just published by **General Electric's** Instrument Department, Schenectady 5, N. Y.

Titled the **Measurement Equipment Catalog,** GEC-1016, the publication contains complete product information including applications, sources of additional information, and pictures. Ranging from simple thickness gages to the mass spectrometer leak detector, there are instruments for research, production, laboratories, and educational use. Measurement categories include color, leak detection, insulation, and radiation monitoring

New products

The Instrof system for the **support of instrument tubing** is the subject of a new catalog from **Instrof, Inc.,** a subsidiary of T. J. Cope, Inc., 711 South 50 St., Philadelphia 43, Pa.

Units described and illustrated in the two-color, nine-page catalog, No. 255, include straight trough, pin type coupler, tube race, reducers, 'T' bar, box girder, radius and miscellaneous fittings.

The 1956 Alkco **catalog of lighting fixtures,** featuring a new 2 foot x 2 foot incandescent fixture for school and office lighting, is now available from **Alkco Mfg. Co.,** 4242 N. Lincoln Avenue, Chicago 18, Illinois.

Incandescent fixtures are now available in "Hap-E-Lite," a new achievement in color-improved lighting. Hundreds of combinations of varying sizes, lens, and frame finishes are listed, including fluorescent and incandescent boxes, recessed and surface mounted.

To help make the **selection of bus conductors** easier, a new, 62-page publication is released by **The American Brass Company,** Waterbury 20, Conn. Included are tables regarding such shapes as channels, ventilated square tubes and round tubes.

There are tables for other rigid bus conductor shapes and also data for bare copper wire and cable as well as for the most commonly used alloy wires. Ask for Publication C-25, "Copper Conductors."

An all-new 12-page Catalog No. 52, outlining the uses and advantages of Orangeburg **fibre conduit,** an underground protective raceway for electric cables, is now available from **Orangeburg Manufacturing Co., Inc.,** Orangeburg, N. Y. Over 25,500 copies of the new catalog are also being distributed with Sweet's Architectural and Industrial Construction Files, reaching architects, engineers, and federal and municipal government offices.

The Redmond **MicroMotor Catalog,** containing detailed information on the complete line of Redmond fractional horsepower electric motors, as well as Redmond MonoMotors, blowers, and special products, has been published by the **Redmond Company,** Inc., Owosso, Mich.

Included in the 12-page catalog are photographs, diagrams, and performance data. The very popular types AY and BY Redmond Tri-Flux motors with Uni-Cast construction are described, as well as the new line of type CY permanent split capacitor motors.

Stanley magnetic level leaves both hands free

WIDE APPLICATION by plumbers, sheet metal men, electricians, steam fitters, steel construction men and others, including home mechanics, is foreseen for a new, magnetic, torpedo level just introduced by Stanley Tools, New Britain, Conn.

The new level leaves both hands free to work because it is equipped with a liftetime Alnico magnet which

holds the tool on ferrous surfaces indefinitely. Contact with metal surfaces does not weaken the magnet.

Another important feature of this light weight tool is its three glasses: plumb, level and 45 degree. A Stanley magnetic level slips into and out of pockets without snagging and is easily handled because of its tapered torpedo design.

Redesigned fluorescent doubles light output

A NEW FLUORESCENT lamp with double the light output of present tubes of equal length has been developed by the General Electric Company, Nela Park, Cleveland 12, Ohio:

The increased light is made possible by a revolutionary change in tube design. It features a series of lengthwise dents or grooves along one side of the eight-foot-long fluorescent tube. Because of its high light output and unique appearance, the new lamp has been named "Power-Groove."

At the grooves, the new tube is nearly U-shaped in cross-section. This design permits a maximum circumference of the tube while constricting its inside area.

The greater light output results from an increase in area of the lighted tube surface, the higher wattage at which the new tube can be operated, and the more effective use of energy within the tube.

The development breaks through a stubborn barrier which has restricted the amount of light obtainable from fluorescent sources, according to Vernet C. Kauffman, manager of engineering for the Large Lamp Department at Nela Park, Cleveland. It achieves its huge gain in light output with no loss in efficiency, or units of light produced per watt consumed.

In the past, all popular fluorescent lamps have been tubular sources of light of varying diameters and lengths. The new development, spearheaded by Eugene Lemmers, G-E discharge lamp engineer, incorporates a series of lengthwise grooves along one side of the lamp, increasing greatly the permissible wattage input and light output of a given length of lamp.

The scientific principle involved is to diminish the internal loss of energy before it can be turned into visible light, Kauffman explained. The loss is caused largely by absorption in the mercury vapor within the lamp. The grooves constrict the area within the bulb, and since the radiation has less distance to travel, more of it survives to activate the phosphor and create visible light.

The relatively new "rapid start" principle is being used in these lamps so that they will be essentially instant starting and have ballast equipment of minimum size and cost.

Conduit bushing drop out protects cable insulation

A NEW FITTING for its cable supporting systtem of prefabricated expanded metal trough, has been announced by T. J. Cope, Inc., Collegeville, Pa.

The new conduit bushing drop out allows cable to pass easily from Cope cable trough into a conduit. The

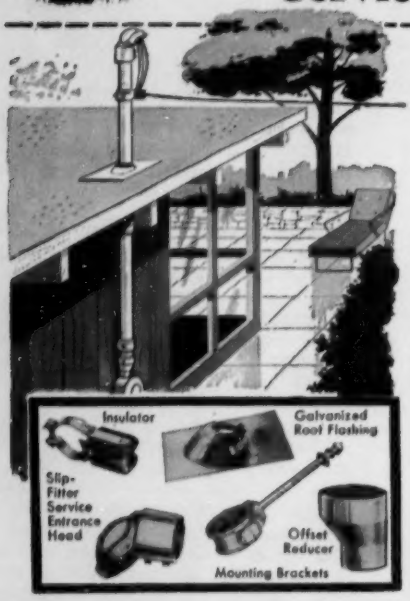
aluminum drop out provides a smooth surface that protects the cable insulation.

The drop out can be placed any-

For quick, easy installation

It's Blackhawk

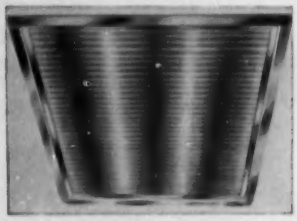
Service Entrance Masts



For an easy, quickly installed Service Entrance Mast, the name to remember is Blackhawk. Blackhawk . . . with Slip-Fitter Service Entrance Head . . . with new combination 2" and 2½" slip fit unit with 1¼" service entrance cap. Blackhawk . . . with the service entrance head that slips over the conduit . . . needs no threads . . . no extra clamping devices . . . no special tools for installation. Simply tighten the two set screws and the Blackhawk Slip-Fitter Service Entrance Head is securely in place. The Blackhawk Service Entrance Mast is available in complete kits or as separate fittings. Whichever way you buy, the name to remember is Blackhawk.

BLACKHAWK INDUSTRIES
Dubuque, Iowa

Blackhawk Industries



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the improved new . . .

AUTOMATIC
MODEL 610
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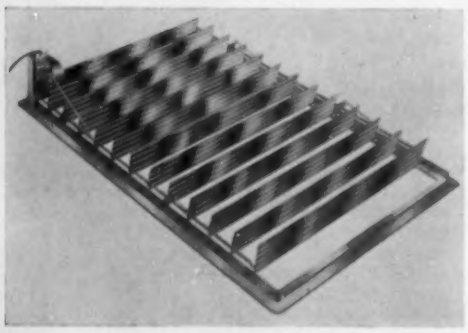
MODEL 610M
MOTORIZED



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AUTOMATIC CEILING SHUTTER
Outstanding Features of Model 610 Automatic Ceiling Shutter

- Neutral Aluminum Color Blends With Any Decoration and Color Scheme
- Flush Appearance
- One Continuous Panel Regardless of Width
- Maximum Free Air Opening
- Fusible Links Release Spring Action in Case of Fire
- Full Opening Feature Minimizes Fan Air Delivery Loss
- Off White Finishes Available

Southeastern Factory Warehouse
177 Harris St., N. W., Atlanta, Ga.

MANUFACTURED BY AIR CONDITIONING PRODUCTS COMPANY
2340 W. LAFAYETTE · DETROIT, MICHIGAN

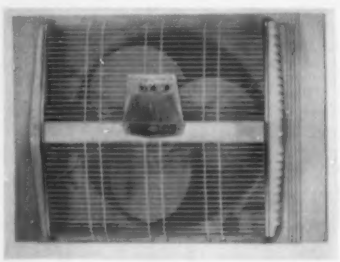
where in the trough system by cutting a hole in the trough and is attached to the trough by bolts. A clamp operated by a hollow head bolt assures that the slotted collar will grip the threaded conduit securely and provide a continuous metallic connection. Necessary bolts are furnished with the fittings.

Expanded metal cable trough is widely used in industry and utilities as a continuous support for power and control cables. A unique feature of the Cope System is the pin-type coupler that replaces conventional nuts, bolts, and washers with only 2 pins that are driven into interlocking barrels and provide strong, secure connections at all joints. Use of the connector greatly simplifies and speeds installation.

New Air King ventilator offers automatic control

THE 1956 version of the top quality Berns Air King window ventilator, a 20" model with push button controls, now incorporates an automatic thermostat for increased utility and convenience.

The electrically reversible unit, Model No. AV20PB, has three speeds



for both exhaust and intake, and all are push button controlled.

The fan, which features slimmed down styling and a safety grill, all finished in lustrous ivory baked enamel finish, delivers 3250/2580/2120 cfm. It is adjustable in width from 28" to 40" with extension sleeves available for wider windows.

New 3-way light for TV viewers

A LIGHT BULB has been developed by Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y., especially for the television addict who wishes to be able to change from reading or sewing to watching television without the bother of changing the lighting arrangement in the room.

Sylvania's contribution to the TV viewer is a new three-way bulb which jumps from 30 watts to 200 watts to 230 watts. Now the person who is doing a "seeing" task which requires about 200 watts of illumination in the room can flip the

swith and obtain a soft 30 watts, just the right level of light for television viewing or conversational lighting.

As a further boon to TV viewers, the lamp is made with a special white inside coating which greatly reduces glare and softens shadows, according to Lawrence P. Pleasants, merchandising manager of Sylvania's Lighting Division. The lamp is made with a standard medium base to fit most three-way floor and table lamps.

Low-cost fluorescent units for commercial interiors

BENJAMIN Electric Mfg. Co., Des Plaines, Ill., announces its new "Sky-Liter" fluorescent lighting units as "a new concept in low-cost, luminous beauty especially suitable to commercial interiors where a distinctively-lighted ceiling is desired."

The Sky-Liter units are available in three different designs: (1) the "Rattan," a new weave pattern in plastic; (2) the "Saxon," featuring

down-to-earth simplicity; and (3) the "Crystal," which presents a multiple-faceted surface that lends beauty and quality to any type of ceiling.

Sky-Liter Units are designed for surface mounting or recessed installation. Sizes are 2′ x 2′, 2′ x 4′, and 2′ x 8′. These new units utilize 24 inch, 20-watt (Trigger Start); 48 inch Rapid Start; or 96 inch Slimline lamps. Both recessed and surface mounted Sky-Liter units may be installed individually, in tandem, parallel or at right angles, to achieve any geometric design.

Aluminum enclosed floodlight for 750-1000 watt lamps

AN ALUMINUM enclosed floodlight—Series 1700—for 750-1000 watt lamps has been announced by Steber Manufacturing Co., Broadview, Ill.

Series 1700 includes versatile mountings for crossarm, poletop, pipe and wall installations plus a new fitting for parapet mounting. Each unit is equipped with thermal shock

Your key to economy and dependability

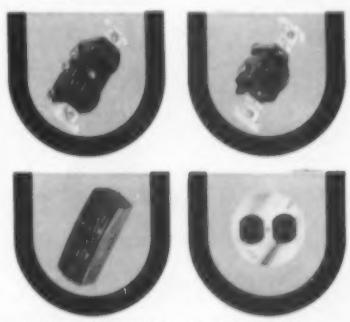
LEVITON U-GROUND DEVICES

Yes, Leviton is your key to cost-*economy* because Leviton has the know-how of mass producing Wiring Devices — gained over almost half a century of manufacturing experience. Leviton knows how to keep quality at the top, and prices at the bottom.

There's no need to sacrifice quality for the sake of economy, either. Leviton has *absolute quality control* — from selected raw materials to completed product. That's your key to *dependability*.

Now available: a new combination switch and U-ground outlet; a complete line of 3-wire U-ground caps and connectors; single and duplex receptacles, receptacles on covers — all in either tandem or parallel types. Duplex receptacles are also available with grounding terminals for individual outlets.

Follow the leaders! **Specify LEVITON U-GROUND WIRING DEVICES.**



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BRIGHT, NEW STONCO PROFIT-MAKER

Bell Holder for Medium Base Spots and Floods is Weathertight... Rust Proof . . . Corrosion Resistant — Assures Longer Lamp Life

This new addition to Stonco's full-line of outdoor lighting equipment has many special, profit-making features. It's a fast moving, big-selling floodlight designed to do hundreds of lighting jobs, safely, efficiently in any weather.

Most important, this newly-developed Stonco 40-L Bell Holder is "air-conditioned" to burn cooler. Lamps last longer. They're easier to remove when necessary, too, because extra grip-space provides quick relamping and eliminates "frozen bulbs."

ONE SOURCE — Stonco's full line of outdoor lighting equipment offers one source for all types of outdoor lighting and related equipment. Write for advance catalog page on the new Bell Holder and for further details on other products. See for yourself why Stonco special features mean competitive products that move faster.

CLUSTER LIGHTS

SUPER SPOTS

ISLAND LIGHTS

VAPORTIGHT

For outdoor lighting - It's Stonco

Stonco

ELECTRIC PRODUCTS CO.
Kenilworth, New Jersey

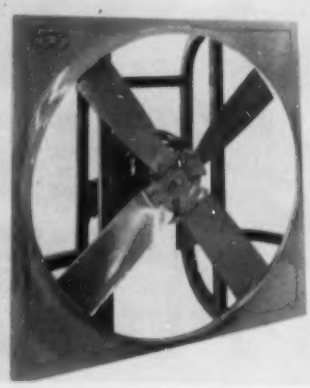
and impact resistant lens and aluminum lens ring. Built-on wrench and watertight connector are also standard equipment. Beam spread is 96° and beam lumens 11350 using PS-52, 1000 watt lamp.

Chelsea fan designed for static pressure application

HEAVY DUTY, direct drive Chelsea Type PLF fans are designed for industrial applications where static pressure is encountered in excess of ⅛ inch, and are said to be more practical than a blower for static pressures under 1 inch.

Furnished with the new Chelsea non-overloading airfoil propellers, Power Line fans are designed for use where direct dust, smoke and steam are prevalent and are ideal for duct, mine, and exhaust applications.

Rugged and efficient, the power consumption is constant on varying



loads. Frames of the Power Line fans are square and easy to install. The panel and venturi orifice are one piece, stamped out of heavy gauge steel, and braces are heavy "U" channel iron, designed for rigidity and long life.

Totally enclosed ball bearing motors, in ratings from ¼ to 7½ hp are specially designed for each application. Explosion proof models are available for hazardous locations. For complete specifications write to Chelsea Fan & Blower Co. Inc., 639 South Avenue, Plainfield, N. J.

New industrial fans described in bulletin

A NEW LINE of industrial fans designed to handle corrosive and explosive fumes, high temperatures and humidity, abrasive dusts and dirt-laden air is featured in a bulletin compiled by the Propellair Division of Robbins & Myers, Inc., Springfield, Ohio.

The six-page, two-color bulletin describes the applications for the belt-driven tubeaxial fans and the

sell the **AUDIBLE SIGNALS** that are **EASIER to INSTALL**

Faraday Uni-Pact
1. Wire to safe, dead-front adapter plate from any 4" outlet box, Wiremould or Conduit.
2. Screw adapter plate to fitting.
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... and give amazing Flexibility, too!

12 different sound instruments all fit one adapter plate

Handle signal systems? Here's why it will pay you to feature Faraday Uni-Pact:

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Virtually damage-proof—sound instruments go on after rough-in men are finish

Safer to install—no exposed terminals in dead-front adapter plate.

Note: *Smart contractors rely on Sperti Faraday engineering for the best in:*

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Engineers in Sound and Sight Since 1875
ADRIAN, MICHIGAN

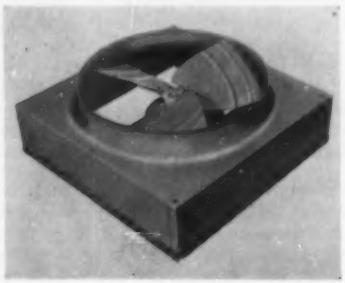
requirements for use under special conditions such as high temperatures, corrosive exhaust and outdoor installation.

Photographs, cross-section drawings and charts illustrate features of the fans, which are available in two types—for applications at normal or high temperatures.

Ventura attic fan for home cooling

A NEW SERIES of Ventura attic fans for residential "comfort cooling" installations is now available from American Blower Corp., Detroit 32, Mich.

Designated Model CA, the new units feature quiet performance and economical operation. The V-belt drive design operates at low fan



speed. The fan wheel rotates effortlessly on precision ball bearing mountings and the motor is mounted on resilient rubber cushions which dampen vibration and guarantee operation at minimum sound level.

Model CA attic fans are available in eight sizes having certified rated capacities from 4400 to 21,500 cfm at zero static pressure. Nominal wheel diameters are from 24 in. to 48 in.; motor horsepower ratings are from 1/6 to 3/4.

Stainless steel wall plates for low-voltage switches

A NEW LINE of stainless steel wall plates for low-voltage, remote-control switches was recently introduced by the Wiring Device Department of the General Electric Co., 95 Hathaway St., Providence 7, R. I.

These new plates have a new contour that blends gracefully with modern interiors. There are no grooves or surface decorations to catch dust. The satin-like finish of these stainless steel plates are easily cleaned with a damp cloth and they will retain their bright, attractive finish with little care.

Stainless steel plates are especially practical for commercial applications where they blend perfectly with modern equipment and electrical appliances and will withstand hard usage in office buildings, stores, restaurants, hospitals and other institutions.

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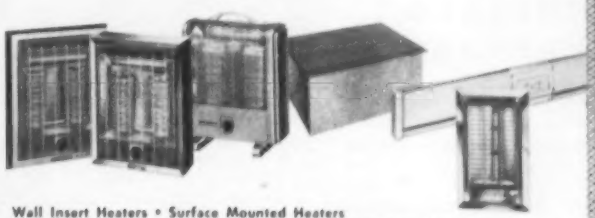

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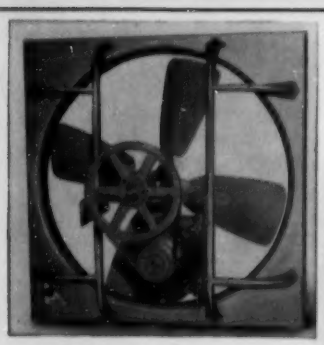

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- Now! Many big jobs opened up by this big new line!
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- A new high in performance for propeller fans!

Above are some of the 60 "Buffalo" Design 53 Belt-Air Package Fans delivering 1,439,000 cfm on only 66 HP in a large Coliseum. Here's a new high in performance for these simple-to-install fans. Rugged, long-lasting construction too. 8" to 144" sizes. Think of the wide range of jobs you can handle easily, rapidly and to satisfaction! Write for prices, details today!

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VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING
FORCED DRAFT COOLING HEATING PRESSURE BLOWING

New weatherproof outlet with own mounting box

A WEATHERPROOF duplex outlet, complete with its own mounting box, has been developed by Pass & Seymour, Inc., Syracuse, N. Y. Cover and plate gaskets as well as a rubber grommet are furnished with the device to seal the entire installation

against the weather. Positive latching aluminum alloy caps seal the unit entirely when it is not in use.

The box itself is of cast aluminum. The entire installation is especially treated to withstand severe weather conditions such as the U. S. Navy salt water spray tests. A provision is made in the box for a third wire ground wherever it is necessary. The unit is rated at 15 amperes, 125 volts.

It is necessary to drill only one hole to install this weatherproof outlet.

Insulated outlet box with standard round knock outs

THE PRODUCTION and immediate availability for distribution of a new, molded fiberglas reinforced plastic outlet box has been announced by Porcelain Products Inc., Findlay,

Ohio. The revolutionary new box, cataloged as the #9314-C, combines the desirable features of standard steel boxes with the inherent qualities of reinforced plastic, plus economy and ease of installation.

The fully insulated box completely eliminates need for grounding on

many circuits. The remarkable strength, impact and electrical resistance of fiberglas reinforced polyester produces an outlet box that is more durable, moisture and fire resistant, will withstand high temperatures, will not warp, stretch or distort or deteriorate with age, yet weighs a fraction as much as their steel equivalent. The FRP outlet box will not corrode or attract condensation, making it ideal for use in damp places.

Also, for the first time, an insulated outlet box is available with standard round knock outs, completely sealed and easy to remove, permitting the use of standard connectors when desirable. The #9314-C octagon box is furnished with or without internal clamps.

New line of 15-amp toggles available in three styles

A NEW LINE of 15-amp single and two-circuit toggle switches is announced by the McGill Manufacturing Co., Inc., Electrical Division, Valparaiso, Ind. Designed for a-c operation, models are available in three separate switching arrangements.

Model 90 is a single-pole single-throw switch designed for on-off operation. Model 91 is a two-circuit, single-pole, double-throw switch with a center "off" position. Model 92 is a two-circuit unit similar to Model 91, except that it throws directly from one circuit to another with no "off" position.

All are rated for ¾-hp capacity and for 15-amp service at 125 volts, or 10 amps at 250 volts. They have a molded phenolic case with exposed parts finished in bright nickel. Switching mechanism features heavy silver button contacts.

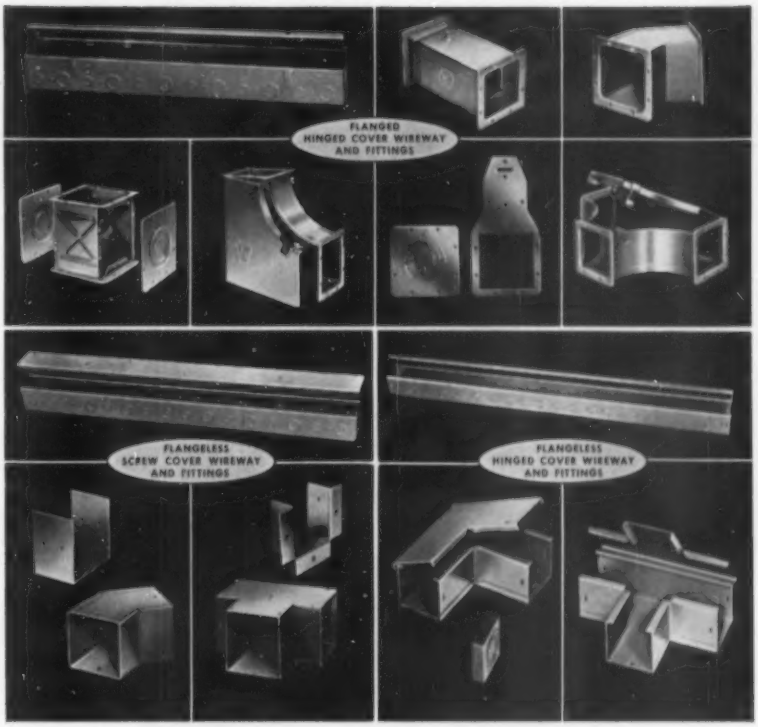
Switches are available with screw terminals, soldering lugs, or spade terminals to fit AMP 41202. Dimensions are: ½-in. wide, ½-in. thick, and 1⅛-in. long. The 15/32"-32 threaded nipple is 7/16-in. long.

G-E time switch features unique shearing action

A NEW general-purpose time switch, featuring greater reliability at less cost than its predecessor, has been announced by General Electric's Instrument Dept., Schenectady 5, N. Y.

Suitable for indoor and outdoor use, the new heavy duty TSA-40 (replacing the T-27) will turn electric circuits on or off at any time of day. It can be used to control all types of street, sign, store and flood lighting, capacitor switches, heating, air-conditioning and refrigeration equipment, irrigation and pump devices, and many other types of apparatus where precise time control is necessary.

An outstanding feature of the TSA-40 is the unique shearing action of the contacts which are forced to slide



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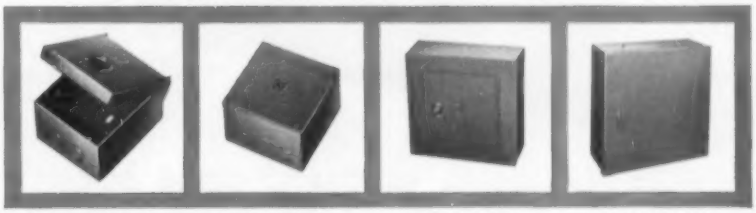

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Here it is . . . the most extensive line of wireways and fittings on the market today! Yes, it's the Keystone Quality Line . . . with every item "job-engineered" to fit *right* into most any electrical distribution system, built *right* to speed installation, reduce costs, and increase profits. For example, both flanged and flangeless types of wireway are produced and stocked in a wide range of standard sizes and lengths, with or without knockouts. And special sizes or types are also available to meet unusual installation problems. There's a complete selection of auxiliary fittings to choose from, too, plus cutout and pull boxes in more than 50 different stock sizes . . . and a variety of telephone and current transformer cabinets to meet your particular needs. So save time, save money on wiring installation jobs . . . go "Keystone" all the way!

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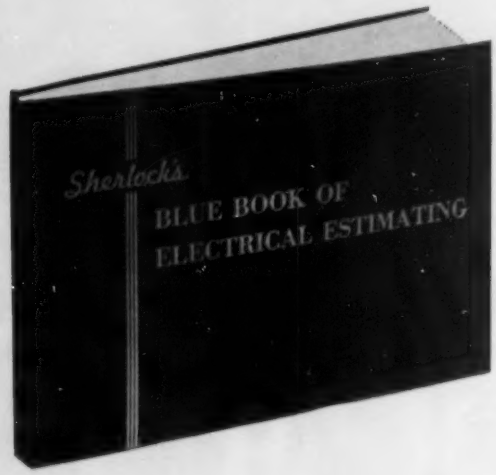

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July, 1956

against each other as they open and close. This prevents welding and keeps contacts clean under heavy overload conditions.

Unit construction of the terminal block and contacts eliminates internal wiring which helps prevent hot spots and burnouts, say General Electric engineers. The one-piece assembly can be removed by loosening two screws — a big step toward simpler maintenance.

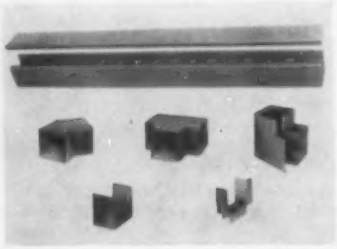
Operator safety is increased by the dead-front construction of the TSA-40. With the terminal shield in place, adjustments may be made to the

trippers or the time set without the possibility of accidental contact with the terminals.

The TSA-40 has a 4-watt motor with permanent silicone-grease lubricant sealed in for increased longevity and improved efficiency in a wide temperature range. The new Telechron (trademark) motor has positive operation from —50F to +150F, making the timer adaptable for unlimited use under almost any climatic conditions. The motor's sealed-in lubricant makes it possible to stock the switch for extended periods without danger of the motor becoming inoperative, the engineers said.

Special size wireways assure flexibility

A COMPLETE engineering and custom manufacturing service on special sizes of flangeless screwcover wireways and necessary auxiliary fittings to assure maximum flexibility in



meeting wiring layout requirements, is now available through Keystone Manufacturing Co., 23328 Sherwood Rd., Center Line, Mich.

All special wireways and fittings

are manufactured exactly to specifications in any gauge of steel and to any size required. Custom items are supplied without knockouts but special conduit drillings for individual requirements can be furnished, when desired, at a nominal extra charge. Standard finish is a hard gray enamel. Other special finishes can be provided upon request, and galvanized wireways and fittings are also available.

All-metal hanger outlet for electric wall clock

AN ALL METAL electric clock outlet with large rectangular opening (1⅜" x 2⅜") permitting easy finger insertion of plug caps and allowing ample room for storage of excess wire is now being manufactured and marketed by Bell Electric Company, Chicago, Ill. This new electric hanger outlet permits the clock to hang flush to the wall.

Made of heavy-guage durable metal, the outlet plate features a built-

in hanger prong which securely holds the electric wall clock. Plates are available in choice of eight popular finishes: chrome, brass alloy, satin brass, chrome on brass, ivory crackle, brown crackle, white paint and ivory paint.

Two-piece construction eliminates excess parts and gives rigidity. Durable Bakelite outlet is held in place by tight spring clips permitting removal without necessity of taking plate apart. Exclusive double-wipe bronze contacts provide firmer plug grip and better electrical contact.

Markstone new 1956 lighting fixture catalog available

A NEW, greatly enlarged, edition of their beautifully illustrated "Lighting for Modern Living" catalog has just been released by Markstone Manufacturing Company, 2460 W. George St., Chicago. Ill.

Attractively printed in six eye-catching colors, the big 32-page catalog includes the latest additions to

Now! Wire Nuts

THE SOLDERLESS, TAPELESS WIRE CONNECTORS
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are UL approved for 600-V. use

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SCREW-ON Wire Nuts® FOR QUICK, EASY, LOW COST SPLICES ON EVERY WIRING JOB

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The Standard of Comparison... with Quality Buyers Everywhere!
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Available in Canada thru Curtis Lighting Ltd., Leaside, Ont.

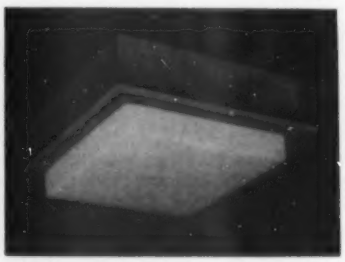
Markstone's line of residential and commercial lighting fixtures. Among the new fixtures are a new series of "Hi-Hat" round recessed boxes; pull downs; Arro-Lite, a new fully enclosed fluorescent unit; and the company's dramatic new Riviera Series — a blending of continental European styling and Markstone crafts-

manship and manufacturing skill. Appropriate for every room in the house, office or factory, each incandescent and fluorescent fixture is fully illustrated and described.

Markstone's technical information, lighting curves and actual lighting applications makes this catalog an excellent selling tool for electrical wholesalers and dealers as well as a handy reference for architects, contractors, builders and others who specify lighting.

Recessed fixture suitable for acoustical tile construction

THE PERFECLITE Company, of Cleveland, Ohio, manufacturers of illuminated exit signs and incandescent lighting fixtures for either commercial or residential installation, has announced the addition of a brand



new extra shallow depth recessed lighting unit to their line.

Especially suitable for use in acoustical tile construction, this new overhead fixture, designed to accommodate a 100 to 150 watt lamp, is also ideal for marquees, canopies and all limited head room areas.

The 18 gauge steel rust proof box measures 11 1/2" x 11 1/2" x 3" deep.

Automation

(Continued from page 51)

ton president, reports that the innovation has far-reaching significance because it punches through the limits of existing control systems and provides a whole new set of highly flexible control tools which will make it possible to extend automation much more broadly in American industry.

He said a large percentage of industry's control applications can now be handled by the present units available in the assortment of 21 electronic building blocks. Merely by connecting the strategic components dictated by the specific applications, companies can secure control systems at costs from one-half to two-thirds less than the traditional concept of made-to-order systems.

Five systems available

Five standard control systems are now available utilizing the modular units: (1) automatic alarms; (2) remote metering; (3) discreet control; (4) proportional control; and (5) transmission systems. They are all complete, integrated systems with all needed components supplied, and installations can be made by any plant electrician. The systems will function over telegraph, carrier circuits, and co-axial cable; and to span long distances or difficult terrain, radio and VHF, UHF, and micro-wave circuits can be used.

The systems are presently in use remotely controlling and supervising widely separated unattended high-power pumping stations in municipal water works. They are immediately applicable to long-distance highly accurate control over petroleum and natural gas field pump lines, power generating stations, power transmission lines, chemical processing plants, and sewage systems. They are applicable to steel mills, mining operations, process industries, and many other types of mass-production processes where control and supervision are required for complicated machinery.

A typical installation illustrates the ease with which the systems operate over long distances. The Shell Oil Company is using the standard components to comprise two applications near Chicago to open and close pipe line valves, one from a control board 25 miles away.

By proper selection of the right pre-fabricated modular units, industries can build their own systems which are versatile enough to measure and transmit operational information to distant control centers on quantities of pressure, vacuum, speed, current, rate of flow, temperature, position, load, and count. The Sparton building block components, in properly integrated systems, will even report on the level of supplies or raw materials in a bin, vat, tank, or similar storage container.

Control features of the varied systems, which can readily be assembled from the standard modular units, are sufficiently flexible to turn any type of manufacturing process on or off, regulate sequence in a factory operation, apply proportionate amounts of control, or supply step and selective controls to plant production lines.

New concept involved

Mr. Smith, whose 56-year-old Sparks-Withington Company is a veteran electronic equipment manufacturer, related that in 1952 when the trend to industrial automation indicated widespread acceptance, he set up a special task force of engineers and research specialists to devise a completely new concept of electronic control systems.

"We recognized that industry lacked an important link through which the benefits of automated processes could be extended. The development of our standardized, interchangeable and mass-produced components, we believe, will provide plants with the flexibility they need to devise their own control systems and to effect significant economies."

To achieve the building block approach, he said his company's engineers undertook the mammoth task of analyzing and classifying the majority of machine and equipment control and supervisory requirements of present-day industry. Then they designed and engineered appropriate "packages" of individual control units, which, when added together, could provide whole systems of regulation for machines or processes.

Two main classes of systems may be provided using the Sparton modular units: completely auto-

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in the PAINE line of Hanging and Fastening Devices:
ONE SOURCE.
Saves you time, inventory and freight costs.
TOP QUALITY
and job-right design make satisfied users.
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One of the easiest to install and most serviceable hangers ever designed. Solves the problem of hanging fixtures and outlet boxes to ceiling or wall surfaces where you can't reach the other side. Simply insert thru hole — as small as 1⅛" in diameter — and wings drop flat, locked in place by a patented key. To release wings for removing hanger at any time, just raise key with screw driver inserted thru nipple. Try these hangers once and you'll use them again and again.

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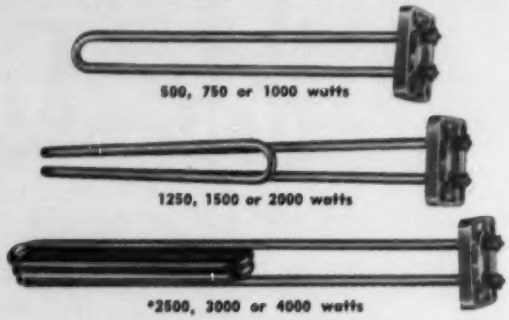
the best craftsmen always take PAINE'S

THE PAINE COMPANY, 21 Westgate Road, Addison, Illinois



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CONSERVATIVE watt density ratings for longer life.

EXTRA HEAVY FORGED BRASS FLANGE eliminates possibility of distortion and resultant leakage.

"POWER BOND" attachment of heater tubes to flange for leakage elimination.

"DIE STRUCK" bends in tubular heater added protection against grounds and shorts.

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M&W *Electrical Fittings*

The M. & W. ELECTRIC MFG. CO., Inc.

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matic, and centrally controlled where a single operator can check the condition of a whole manufacturing process by glancing at an integrated control panel incorporating meters, indicator lights, or a variety of alarm signals.

They will control processes operated electrically, mechanically, pneumatically, or hydraulically; and they are sufficiently sensitive to regulate fractional horsepower motors as well as powerful enough to control 1,000 horsepower units or more.

The miniaturized building blocks used to make up the systems take up approximately one-half to two-thirds less space than has been required in the past for control networks.

All adjustments and calibrations are built into the building block units. Routine maintenance checks are required no more than three times a year and can be carried out by plant electricians merely using a test meter and logging readings which are compared to fixed performance standards.

Maintenance simplified

Maintenance of the modular units is on a calendar basis with standard units simply unplugged and spares plugged in until the original unit is serviced and reinserted into the system. Recommended replacement time cycles are after 10,000 hours of service, or 415 days of use.

The new Sparton systems use, among other techniques, the traditional Morse principles of telegraphy to accommodate multiple signals on a single pair of wires, usually a telephone line leased from the local telephone company and reserved for the exclusive control function.

At present the Sparton building block technique is engineered to provide up to 125 channels of control available in the resulting systems, in a progression of 10, 25, 50, 100, and 125 channel systems.

In a normal 10 channel system, over each channel, it is possible to effect control of eight different functions. In a typical system for the petrochemical industry or a municipal water pumping station, these eight functions might operate as follows. A key is depressed at the control board and—

1. Pump turns on.
2. Signal flashes back, light turns on on control board signalling pump functioning.
3. If pump mal-functions, alarm

light turns on.

4. Bearing temperatures are reported on. Four lights report on two motor bearings and two pump bearings.

5. Signal reports that pump is building up pressure.

6. Signal will report on the correct value of the pump pressure reading, or an alarm warning will sound for incorrect pressure.

7. Control order is transmitted which opens valve to any predetermined degree.

8. Can increase or decrease the open valve position in very small increments—all from miles away.

The systems can integrate memory circuits, and are flexible enough that electronic computers or punched card or punched tape activated equipment can be added.

Know the law

(Continued from page 38)

Strider & Co., 189 So. 518, 123 A. L. R. 1190.)

According to a decision by one of the Texas Courts of Civil Appeals, it makes a difference whether the defect is open and apparent or whether it is concealed (Jones v. Beck, 109 S. W. 2d 787.) Most courts would probably agree on that point.

In a Michigan case, a company that installed an electric fixture in a customer's cellar was not liable for injury to a deliveryman who came in contact with a defectively insulated wire. The reason for the decision was that the real cause of the accident was the house owner's negligence in permitting the wire to remain in that condition. (Griffin v. Jackson Light & Power Co., 128 Mich. 653, 87 N. W. 888.) To the same general effect is a decision by the West Virginia Supreme Court of Appeals in the case of Fickeisen v. Wheeling Electrical Co., 67 W. Va. 335, 67 S. E. 788.

Lamp ballasts

(Continued from page 36)

There is a newer lead-lag circuit which has been on the market for a couple of years. This ballast, whose circuit is shown in Figure 5, consists of a primary, a closely coupled secondary for the lead branch, and a loosely coupled secondary for the lag branch. A very careful job of balancing losses in the various windings for abnormal as well as normal op-

A new quadrant type dead end clamp that more completely meets all the requirements for proper handling of aluminum and ASCR cable on distribution and sub-transmission systems!

- **LIGHT WEIGHT** . . . to reduce cable damage!
- **HIGH STRENGTH** . . . over and above ratings of cables and insulators normally used!
- **ONE-PIECE KEEPER ASSEMBLY** . . . for quicker, simpler installation!
- **FLARED MOUTH** . . . to reduce chafing and vibration damage!
- **CORROSION RESISTANCE** . . . silicon bearing #356 aluminum alloy.

3 SIZES FOR COMPLETE RANGE . . . recommended for all-aluminum and ACSR cable. No liners required.

FOR MORE COMPLETE INFORMATION consult your nearest Anderson representative or contact our home office.

Aluminum & Bronze POWER CONNECTORS • CLAMPS • FITTINGS • ACCESSORIES for SUBSTATION • TRANSMISSION • DISTRIBUTION SYSTEMS *for over a Quarter Century*

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BIRMINGHAM 1, ALABAMA

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24
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CONTACT UNITS

1, 2, 3, 4, 6, 8, 12 poles
Male or Female
Grounded or ungrounded

- Ratings up to 20 amperes 250 volts, D.C., 460 volts, A.C.
- 2 wire and 3 wire fusible plugs
- 2, 3 and 4 unit types for combinations up to 48 poles
- Water-tight types also available

STOCK FEWER ITEMS... HANDLE MORE JOBS

Detailed literature on request.

Sold Nationally Through Authorized Distributors

THE PYLE-NATIONAL COMPANY

WHERE QUALITY IS TRADITIONAL

1354 North Kostner Ave.
Chicago 51, Ill.

eration results in a ballast approaching the size of the series sequence unit.

Labor relations

(Continued from page 40)

an employee in the next classification shall have preference unless a substantial basis exists to justifiy the employee being bypassed. Longley should be given a chance at the job. Grievance granted."

Wiring promotion

(Continued from page 28)

in his home that his out of date wiring system could not absorb all these wonderful new products," said Mr. Marshall, indicating the promotional campaign had brought him a 20% gain in volume within two months, with two or three new leads every day.

"I got to thinking of what the electrical industry was doing for the contractor, and how little the contractor was doing for himself by not tying in with all this available business. We contractors are right in the front lines telling people in their homes what is wrong with their wiring systems. We're the ones they call in when there's electrical trouble. Why haven't we been telling them that their wiring systems are out of date and that they can't keep adding appliances without increasing their service equipment? That is why I embarked on this all-out campaign to educate the public."

Selecting old neighborhoods in the metropolitan area where he knew old houses still retained the wiring systems of 20 or more years ago, Mr. Marshall sent out 50,000 printed flyers. He instituted at the same time a sales campaign among his mechanics, impressing on them today's need for the mechanic to become a salesman who could explain why rewiring was a necessary safeguard in every home where new appliances had been added over the years.

When a customer indicates interest in having capacity increased, an estimator is sent in to make a survey of the home's wiring needs and report to the customer in a detailed listing precisely what the meagrest job will cost and what an ample and recommended job will cost. When the customer wants to know what the job will entail in work and appearance, a file of pictures is shown.

WADSWORTH
New
"E-Z-RED" CIRCUIT BREAKERS
12-16 OR 20 BRANCH CIRCUITS
SINGLE AND/OR DOUBLE POLE

100 AMP.
FUSIBLE MAIN DISCONNECT
FOR "E-Z-RED" (15 TO 50 AMP.)
CIRCUIT BREAKER BRANCH CIRCUITS

The WADSWORTH ELECTRIC MFG. CO. INC.
Covington Kentucky

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ELLIOTT'S COMPLETE
LINE OF FITTINGS

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★ ★ ★ ★ ☆ ★ ★ ★

Write For Complete Catalog

ELLIOTT ELECTRIC
PRODUCTS CO.
1513 Olmstead Av., New York 62, N. Y.

Mr. Marshall takes pictures before and after each installation with a three-dimensional camera. Using color film, he carries a file in each of his trucks, and shows "before" and "after" pictures through a viewer to each prospect. His estimator points out budget installations and recommended installations with a view to the future.

"We always quote two prices to a customer—one price on a minimum job that will just cover appliances in use, the price a competitor might make him right after he put in a dryer or water heater, and a second price, what we would consider adequate to take care of the customer's needs for the next 20 years," explained Mr. Marshall.

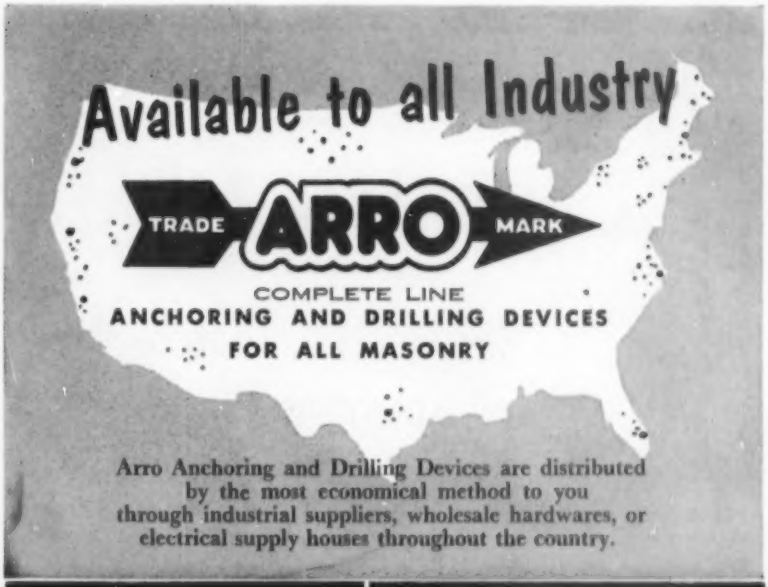
"We point out that we are actually saving him money though our estimate may initially come to more. For if a customer has to pay an electrician $50 to cover wiring for laundry equipment, then a couple of years later $100 for an electric range, dishwasher and exhaust system, and then again at a later date when electric heating is put in, he is paying many times over what his initial costs would have been. Moreover, he will get better results, greater efficiency, and lower bills from an adequate system put in right at the start."

After the customer has gone through the file of pictures, and has some idea of what he is going to pay for, and what it will do for him and his home, rewiring becomes more acceptable to him.

"Installation shots of "before" and "after" make selling easier. He is not going into an investment blind. If the recommended and more expensive wiring setup appeals to him, we tell him he may apply for a Title 1 FHA loan for rewiring just as on any other home improvement," continued Mr. Marshall.

Mr. Marshall views electrical contractors as "backward" in their competition with appliance dealers who are selling wiring as well as appliances.

It is time for contractors to seize the initiative from appliance dealers, to rally behind the promotion put out by their power companies, and sell homes on safe wiring, according to Mr. Marshall. There is an enormous sales potential before the appliance dealer gets there and, unless the contractor wakes up, this business will continue to fall to the appliance dealer. Mr. Marshall believes an electric panel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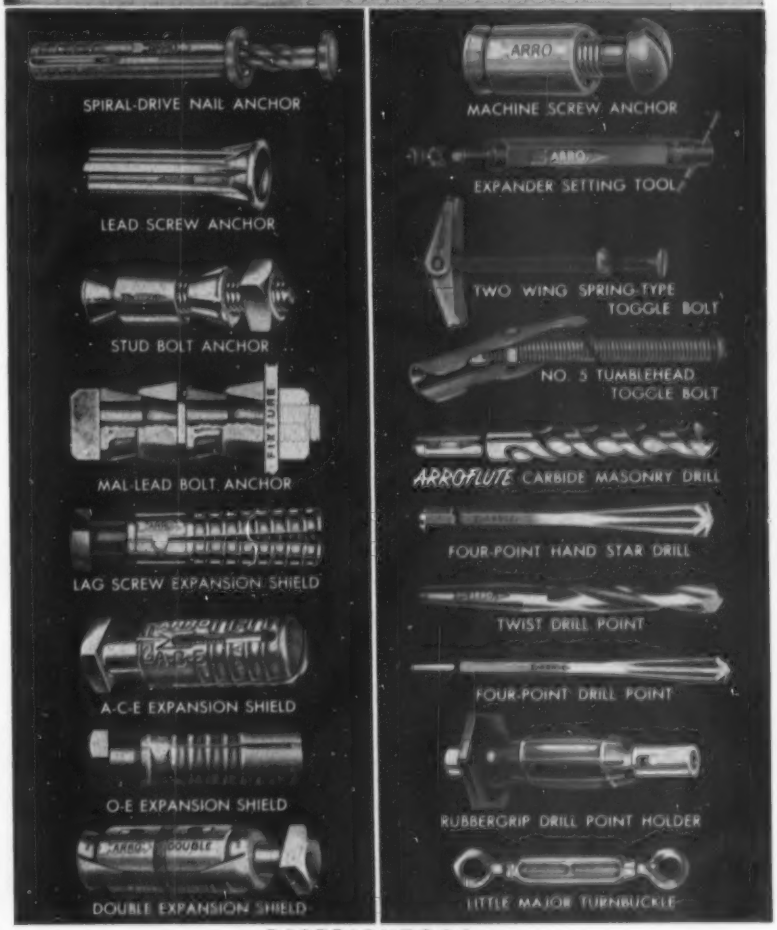

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One Piece

TERMINAL LUGS

AN 659

SPECIFICATIONS

Sherman Terminal lugs to AN659 Specifications for No. 8 to 4/0 Cable sizes are now being manufactured for prompt delivery. Constructed from higher grade electrolytic copper, electro tinned, marked with wire size and "Sherman" Trade Mark.

COMPARE THESE FEATURES

- One-Piece Construction
- 100% Plus Conductivity
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- Uniform Barrel Thickness
- Beveled Mouth for ease of cable entry
- Terminals fit all standard Terminal Blocks
- Crimping Tool locator spot on barrel
- Angle, Two-hole, Center-formed, Types as Needed
- Stamped Trade Name—Wire Size and AN659 Dash Number

CABLE SIZES 8 through 4/0

WRITE TODAY FOR BULLETIN NO. 3

H. B. SHERMAN

MANUFACTURING CO.

BATTLE CREEK, MICHIGAN

similar to his own should be a stimulus to business for all electrical contractors.

After its two-week exhibition at the Bank of Silver Spring, the electric panel is scheduled for a two-week display at an appliance dealer's, following which it will be on view at the Washington Home Show. Permanent placement will be at the Electric Institute's showroom.

Planned lighting

(Continued from page 29)

colors of the new automobiles.

The office building was also vitally important to Mr. Elkes. The manager's office and the general office were illuminated to a level of 65 footcandles. The "closing rooms" for the salesmen, 45 footcandles. In this building, 3-lamp, 40-watt rapid start recessed troffers with albalite glass shielding were employed. Light-colored walls and muted tones of the furnishings give the office an air of cool efficiency.

Two compelling "action" signs draw attention from passing traffic and welcome customers to the Elkes Dale Mabry Branch at each of the two entrances.

Eugene R. Elkes, president of the agency, is well-pleased with the lighting of lot and buildings. As he says, "The lighting techniques utilized at our new branch give us the effects we wanted. Our aim at the Dale Mabry showplace is to display and sell automobiles by creating an informal air, coupled with the exciting glamour of a downtown showroom. Here, light is one of our best salesmen."

Cost-cutting ideas

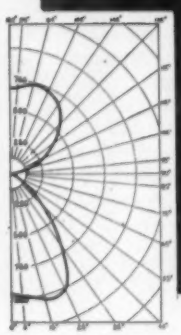
(Continued from page 23)

for job deliveries. The other is used for hurry-up emergencies and service work. It operates on a 24-hour basis, saving use of heavier equipment for this and making the heavier truck available for its own work.

When a job is undertaken and materials bin-stocked, they are carefully listed, along with tools and equipment, and set aside for the job. When it is completed, another slip is made out to account for materials and tools returned. "Then these two are compared with the original job estimate," Mr. Prattini states. "Of course some small amount of overage or underage on a job is normal, but if

CERTIFIED 45° x 45° SHIELDING FOR SCHOOL LIGHTING

Fluorescent by Southern



Here is a fixture not only pleasing to the eye with a 45° x 45° shielding angle, but it has all the qualities of SOUTHERN'S best in design and construction. Can be wired with regular, rapid start, and slimline ballasts. These 2 lite, 4 and 8 foot fixtures are constructed of heavy guage cold rolled steel, designed for either surface (ceiling) or suspension (stem) mounting. The modern designed louvers are securely attached to the "V" type reflector forming one unit, and may be lowered from either side without the use of tools. This SCHOOLITE fixture may be joined in continuous rows without additional parts.

Remember, specify and satisfy with SOUTHERN fluorescent fixtures.

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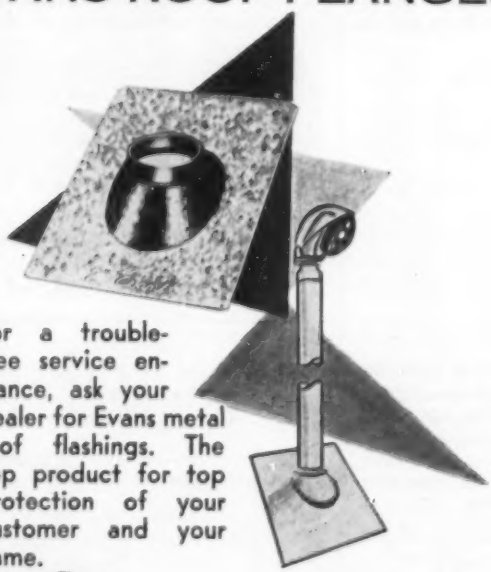

For a trouble-free service entrance, ask your dealer for Evans metal roof flashings. The top product for top protection of your customer and your name.

Evans Metal Co.
P. O. BOX 97—NORTHSIDE STATION
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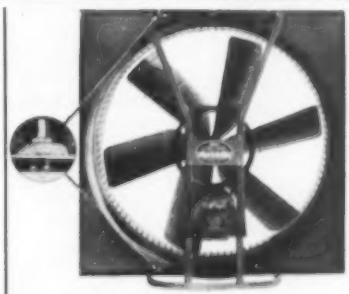

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For quiet, general purpose ventilation at lowest cost, you can't beat the Coolair type CQ shown here. It's ideal for schools, auditoriums, and stores . . . wherever a quiet fan is needed.

Exclusive rubber vibration insulators, as shown in the insert photo, are built into the fan frame. You can meet specifications for resilient-mounted, wall-type fans with far less installation trouble and cost. No bother with mounting fan on rubber or felt.

Proof that Coolair prices are competitive—Coolair fans were used on all four U. S. 3rd Army barracks rehabilitation projects started in the summer of 1955.

Write for Free Catalog Folder:
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overage is serious we know something is wrong. Either our estimation was far afield—in which case bid estimation has to be tightened up for the future—or else there is wastage or pilferage. We're alert to discover it and close that cost leak."

Brignac Electric's material control plan includes material salvage. "We try to save all copper from jobs. It can add up to a pretty large amount when melted down and totalled for six months," Frank Prattini points out. "At today's high copper prices, our yearly saving is not small at all. Additionally, our men are instructed to save short lengths of conduit and bring it back to the shop. These are sent along on future jobs. Having them on hand saves the cutting up of new conduit which in turn would mean more wastage."

K&H
UNIVERSAL PRESSURE TYPE
ADJUSTABLE LUGS

One or two bolt holes

Wire sizes Nos. 14 to 1,000,000 CM. One-piece construction—easily installed. Body is well proportioned to withstand excessive use, with ample thread area. Makes tenacious grip on stranded conductors, forcing contact with each wire in strand, thereby insuring utmost in conductivity—bottom of tongue surface is ground. Not susceptible to release under vibration.

Write for dimensions and prices

KRUEGER & HUDEPOHL, INC.
VINE AT THIRD E. S. CINCINNATI 2, OHIO

Magnetic amplifiers

(Continued from page 27)

magnetic amplifier to evaluate its application to a specific job.

Limitations of the magnetic amplifier may be listed as follows:

1. Single-polarity output.
2. Finite minimum time delay, dependent upon supply frequency.
3. Finite minimum signal level required.
4. Incomplete cutoff sets minimum output.
5. Somewhat temperature sensitive (over wide ranges).
6. Somewhat sensitive to variations in supply voltage and frequency.

On the other hand, the strong points of magnetic amplifiers include these advantages:

1. Static device with long life and minimum maintenance.
2. Shock resistant.
3. No warm-up period required
4. Control windings isolated from each other and from the load windings.
5. Flexibility.
6. Fast response.
7. Device acts as variable reactor, not resistor. Therefore more efficient.

Control designers have studied the pros and cons of this device carefully and have quite apparently found generous room for them in industrial control. In addition to those applications described previously, magnetic amplifiers have been used in the paper industry on sectional paper machine drives, super-calenders, and core-type reel drives. The lumber industry is using log carriage drives and veneer lathe drives with these static control devices. The steel industry has numerous installations including tandem and non-reversing mill main drives, tandem-mill reel drives, processing-line speed regulators, pickle-line loop regulators, and others. All magnetic amplifier voltage regulators have been used in central stations. Mine hoists, power shovels, a-c cranes, and printing presses have employed magnetic amplifier control.

As more people become familiar with magnetic amplifier applications and gain more experience with them, the field will continue to grow larger. With the inherent reliability, simplicity, and ruggedness of the magnetic amplifier, control and design engineers are certain to utilize ever expanding field of regulated systems and automatic controls.

Furnishing "sleeve"

(Continued from page 20)

60 houses built by one contractor for whom Hampton Electric Company provided 60 "future air conditioning facilities" combined with automatic gas heat.

In multiple instances such as this, Hampton Electric Company will assume the full cost of the sleeves and where only one or two homes are involved the contractor is asked to split the cost.

Eventually, of course, the St. Louis contractor hopes to provide the sleeve installation for homes of much more modest cost. For the

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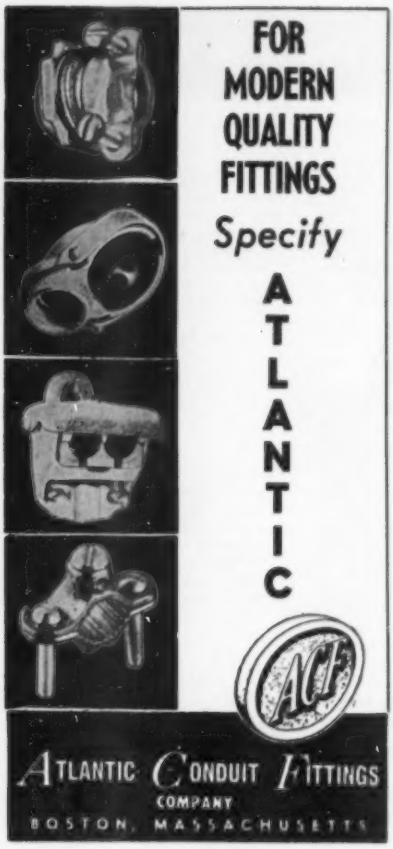

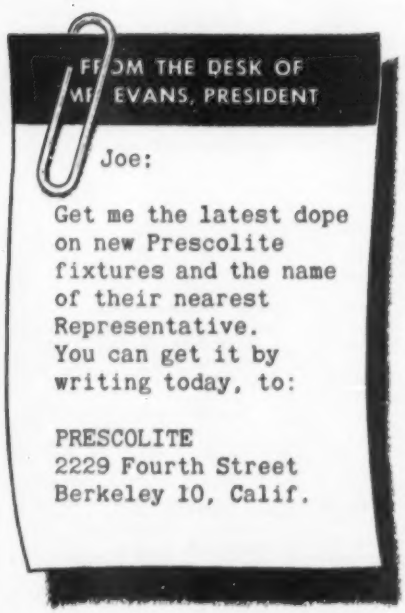
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MR. EVANS, PRESIDENT
Joe:
Get me the latest dope on new Prescolite fixtures and the name of their nearest Representative.
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time being, however, it has been felt wiser to concentrate on the home owner whose purchasing potential shows the brightest future.

Mr. Muno has strong convictions in the matter of "home owner loyalty." While it would be readily possible for almost any manufacturer's air conditioning equipment to be installed, he feels that the builders exhortations plus the savings to the home buyer on the coil installation, and the selling effect of the decal on every sleeve will insure that Hampton Electric Company gets the call when the home owners finances improve to the point that air conditioning can become a reality.

Hotel lighting

(Continued from page 19)

of corrugated white luminous ceiling above the cashier's and registration counter. This plastic grillwork is constructed of gray translucent square rods punctuated at intervals with squares and strips of yellow, red, blue, green and white translucent acrylic. The free-flowing pattern, combined with the dashes of color, relieve the essentially business-like character of the desk area and convey a feeling of spaciousness without emphasizing length. The grill-work is assembled by cementing.

Shatter resistant fixtures

Each guest room closet at the Statler Hilton is fitted with a cylindrical light shade, 5 inches high and 4¼ inches in diameter and fabricated from ⅛ inch white translucent acrylic. The shade is mounted flush with the ceiling with the end of the cylinder (cut out to receive the bulb) screwed to a recessed junction box in the ceiling. The shade diffuses the light evenly through the closet interior, and eliminates the annoying glare of the incandescent bulb. As a matter of practical housekeeping since the plastic is virtually break proof, it reduces sharply the appreciable breakage rate occurring with glass fixtures caused by placing baggage and other heavy items on the shelf beneath the light.

The Hilton designers skillfully blended the utilitarian and decorative uses of acrylic plastic by devising techniques of illumination that are interesting, attractive and colorful while at the same time providing ample soft glare-free light.

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MUSCLES
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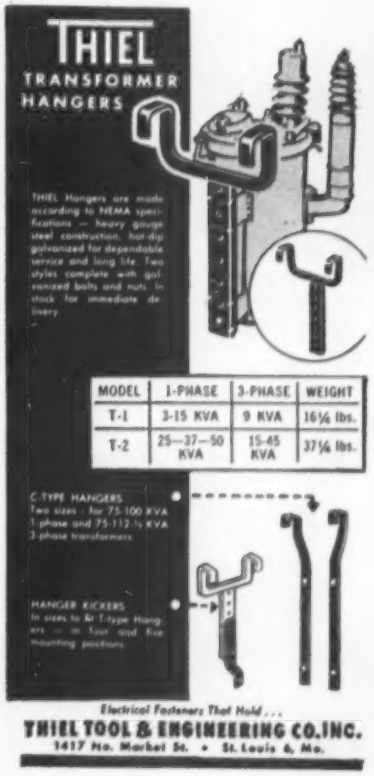
ASK YOUR ELECTRICAL WHOLESALE DISTRIBUTOR FOR THE CABLE WITH THE 60% NEOPRENE JACKET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HH-11	10"	1-100 W
HH-13	12"	2- 75 W
HH-15	14"	2-100 W
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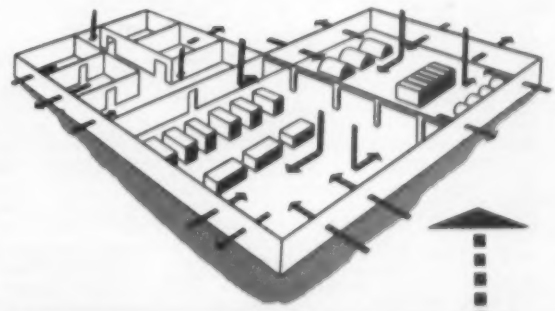

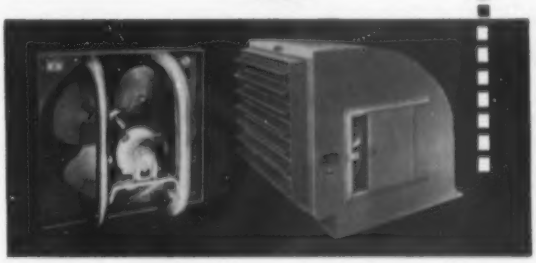

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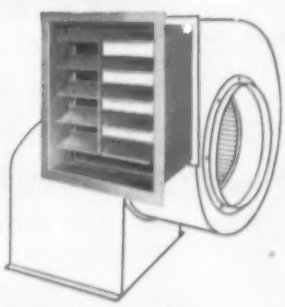

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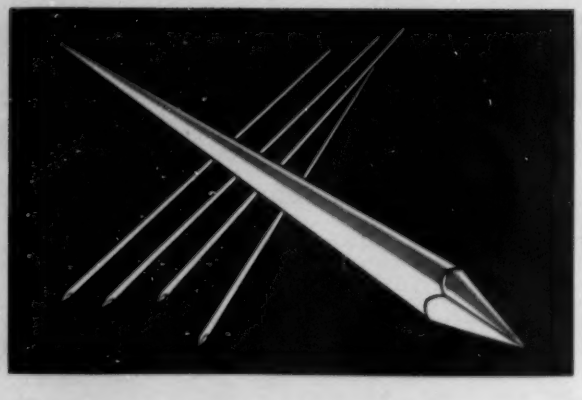

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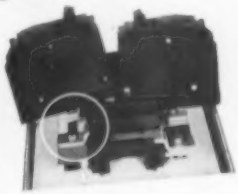

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The spring catch can be replaced by a flush panel type lock, shown at left, by simply removing a twist-out. This lock may be "keyed" to match Square D panelboards.

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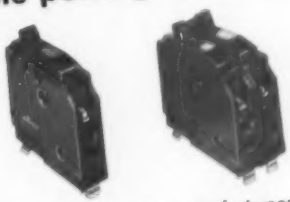

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